xSeries 206
Type 8482 and 8487

IBM

Hardware Maintenance Manual and Troubleshooting Guide

xSeries 206
Type 8482 and 8487

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> **Notes**
>
> - Before using this information and the product it supports, read the general information in Appendix C, "Notices," on page 141.
>
> - **The most recent version of this document is available at http://www.ibm.com/pc/support/.**

About this document

This document contains diagnostic information, a symptom-to-FRU index, service information, error codes, error messages, and configuration information for the IBM® @server™ xSeries® 206 Type 8482 and 8487 server.

Important: The field replaceable unit (FRU) procedures in this document are intended for trained servicers who are familiar with IBM xSeries products. Customer replacement units (CRUs) can be replaced by the customer. See the parts listing in "System" on page 100 to determine if the component being replaced is a CRU or a FRU. Before servicing an IBM product, be sure to review "Safety information" on page 107.

Important safety information

Be sure to read all caution and danger statements in this book before performing any of the instructions.

Leia todas as instruções de cuidado e perigo antes de executar qualquer operação.

在安装本产品之前，请仔细阅读 Safety Information （安全信息）。

安裝本產品之前，請先閱讀「安全資訊」。

Prenez connaissance de toutes les consignes de type Attention et

Danger avant de procéder aux opérations décrites par les instructions.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

Accertarsi di leggere tutti gli avvisi di attenzione e di pericolo prima di effettuare qualsiasi operazione.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Lea atentamente todas las declaraciones de precaución y peligro ante de llevar a cabo cualquier operación.

WARNING: Handling the cord on this product or cords associated with accessories sold with this product, will expose you to lead, a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm. ***Wash hands after handling.***

ADVERTENCIA: El contacto con el cable de este producto o con cables de accesorios que se venden junto con este producto, pueden exponerle al plomo, un elemento químico que en el estado de California de los Estados Unidos está considerado como un causante de cancer y de defectos congénitos, además de otros riesgos reproductivos. ***Lávese las manos después de usar el producto.***

Online support

You can download the most current diagnostic, BIOS flash, and device-driver files from http://www.ibm.com/pc/support/.

Contents

Chapter 1. Introduction

The IBM xSeries 206 Type 8482 and 8487 server is a high-performance system based on IBM X-Architecture™ technologies. It is ideally suited for networking environments that require superior microprocessor performance and improved systems management as well as flexible memory and data management.

You can obtain up-to-date information about the server and other IBM server products at http://www.ibm.com/eserver/xseries/.

Related documentation

This *Hardware Maintenance Manual and Troubleshooting Guide* is provided in Portable Document Format (PDF). It contains information to help a user solve problems or to provide helpful information to a service technician.

- *User's Guide*

  This document is in PDF on the IBM *xSeries Documentation* CD. It contains general information about the server.
- *Installation Guide*

  This printed document contains instructions for setting up the server and basic instructions for installing some options.
- *Option Installation Guide*

  This document is in PDF on the IBM *xSeries Documentation* CD. It contains instructions for installing, removing, and connection optional devices that the server supports.
- *Safety Information*

  This document is in PDF on the IBM *xSeries Documentation* CD. It contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Information* document.

Depending on the server model, additional documentation might be included on the IBM *xSeries Documentation* CD.

The server might have features that are not described in the documentation that was received with the server. The documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the server documentation. These updates are available from the IBM Web site at http://www.ibm.com/pc/support/.

Notices and statements used in this document

The caution and danger statements that appear in this document are also in the multilingual *Safety Information* document, which is on the IBM *xSeries Documentation* CD. Each statement is numbered for reference to the corresponding statement in the *Safety Information* document.

The following notices and statements are used in this document:

- **Notes:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Features and specifications

The following information is a summary of the features and specifications of the server. Depending on the server model, some features might not be available, or some specifications might not apply.

You can use the Configuration/Setup Utility program in the server to determine the specific type of microprocessor that is on the system board.

*Table 1. Features and specifications*

Microprocessor:
• Intel® Pentium 4 Processor
• 1 MB Level-3 cache
• 800 MHz front-side bus (FSB)
 	
Memory:
• Minimum: 256 MB
• Maximum: 4 GB
• Types: PC2700 and PC3200, double-data-rate (DDR)
• Connectors: four dual inline memory module (DIMM) connectors, two-way interleaved
 	
Drives: (depending on your model)
• Diskette: 1.44 MB (two mode)
• Hard disk drive: SATA or SCSI
• One of the following drives:
  – CD-ROM: IDE
  – CD-RW: IDE
  – DVD-ROM: IDE
 	
Expansion bays: (depending on your model)
• Two 5.25-in. bays (one CD-ROM drive installed)
• Two 3.5-in. removable-media drive bays (one diskette drive installed)
• Three 3.5-in. hard disk drive bays with one the following types of drives:
  – Open hot-swap bays
  – Non-hot-swap bays with one hard disk drive installed
  – Serial ATA (SATA) bays with one hard disk drive installed
 	
PCI expansion slots:
• Two PCI-X 66 MHz/64-bit
• Three PCI 33 MHz/32-bit
 	
Video controller: ATI 7000M video controller with 16 MB SDRAM video memory on the system board
 	
Fans:
Two or three speed-controlled fans
	Power supply: One 340 watt (90-240 V ac)
	
	Size:
	• Height: 448 mm (17.25 in.)
	• Depth: 483 mm (19 in.)
	• Width: 265 mm (6.5 in.)
	• Weight: 16.3 kg (36 lb) to 20.8 kg (45.8 lb) depending upon configuration
	
	Integrated functions:
	• Intel Ethernet controller on the system board with RJ-45 Ethernet port
	• Two serial ports
	• One parallel port
	• Dual port Serial ATA controller
	• One internal Ultra320 SCSI port (mini-PCI slot)
	• Integrated RAID capability
	• Four Universal Serial Bus (USB) v2.0 ports (two on front and two on rear)
	• Keyboard port
	• Mouse port
	• ATA-100 single-channel IDE controller
	• ATI 7000M video
	  – Compatible with SVGA and VGA
	  – 16 MB video memory
	
	Diagnostic LEDs:
	• Fans
	• Memory
	• Microprocessor
	
	Acoustical noise emissions:
	• Sound power, idling: 5.3 bel
	• Sound power, operating: 5.5 bel
		Environment:
		• Air temperature:
		  – Server on: 10° to 35°C (50° to 95°F) Altitude: 0 to 914 m (2998.0 ft)
		  – Server off: -40° to 60°C (-40° to 140°F) Altitude: 0 to 2133 m (7000.0 ft)
		• Humidity (operating and storage): 8% to 80%
		
		Heat output:
		Approximate heat output in British thermal units (Btu) per hour
		• Minimum configuration: 595 Btu/hour (175 watts)
		• Maximum configuration: 765 Btu/hour (225 watts)
		
		Electrical input:
		• Sine-wave input (50 or 60 Hz) required
		• Input voltage and frequency ranges automatically selected
		• Input voltage low range:
		  – Minimum: 100 V ac
		  – Maximum: 127 V ac
		• Input voltage high range:
		  – Minimum: 200 V ac
		  – Maximum: 240 V ac
		• Input kilovolt-amperes (kVA) approximately:
		  – Minimum: 0.20 kVA (all models)
		  – Maximum: 0.55 kVA
		
		Notes:
		1. Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.
		2. These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.

Server controls, LEDs, and power

This section describes the controls and light-emitting diodes (LEDs) and how to turn the server on and off.

Front view

The following illustration shows the controls and LEDs on the front of the server.

Ethernet link status LED

CD-eject button

CD-ROM drive activity LED

Diskette-eject button

Diskette drive activity LED

Hard disk drive activity LED

Power-on LED

Power-control button

System error LED

USB ports

Ethernet transmit/receive activity LED
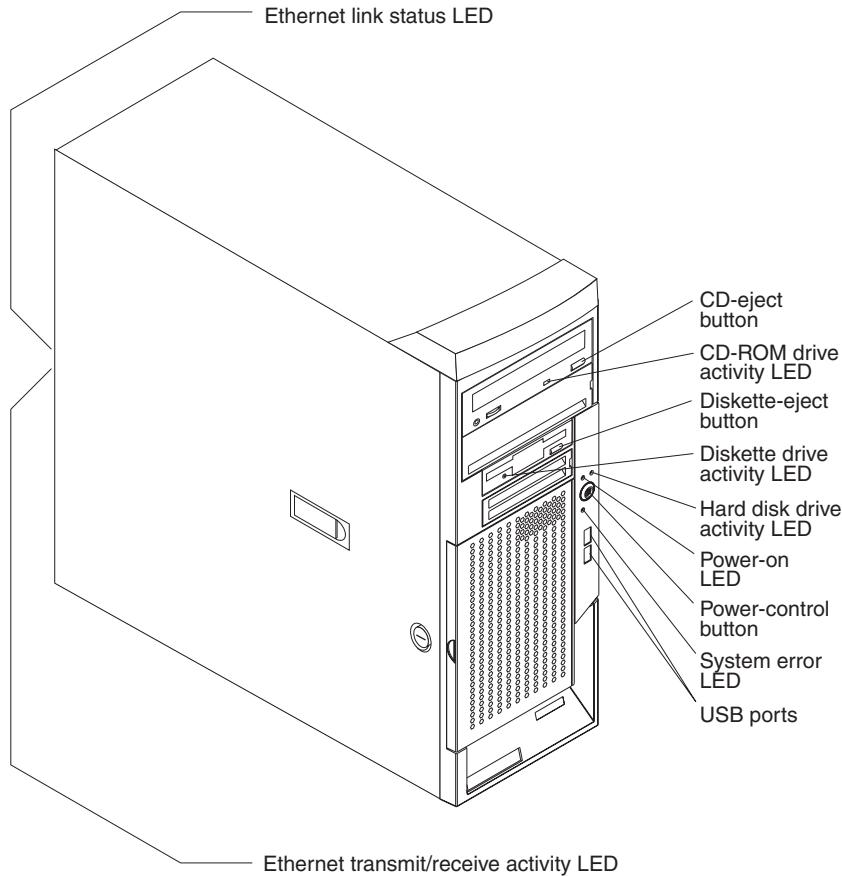
CD-eject button
> Press this button to release a CD from the CD-ROM drive.

CD-ROM drive activity LED
> When this LED is lit, it indicates that the CD-ROM drive is in use.

Diskette-eject button
> Press this button to release a diskette from the diskette drive.

Diskette drive activity LED
> When this LED is lit, it indicates that the diskette drive is in use.

Hard disk drive activity LED
> When this LED is flashing, it indicates that a hard disk drive is in use.

Hot-swap hard disk drive activity LED
> On some server models, each hot-swap drive has a hard disk drive activity LED. When this green LED is flashing, it indicates that the drive is in use.

Hot-swap hard disk drive status LED

On some server models, each hot-swap hard disk drive has a status LED. If the status LED for a drive is lit continuously, that individual drive is faulty. When the drive is connected to an optional ServeRAID™ controller, a slowly flashing (one flash per second) status LED indicates that the drive is being rebuilt. When the LED is flashing rapidly (three flashes per second), it indicates that the controller is identifying the drive.

Power-on LED

When this LED is lit and not flashing, it indicates that the server is turned on. When this LED is flashing, it indicates that the server is off and still connected to an ac power source (standby mode).

Power-control button

Press this button to turn the server on and off manually.

System-error LED

When this LED is lit, it indicates that a system error has occurred. An LED on the system board might also be lit to help isolate the error. See "System-board LEDs" on page 72 for additional information.

USB ports

Connect a USB device to these connectors.

Ethernet link status LED

This LED is on the Ethernet connector on the back of the server. When this LED is lit, it indicates that there is an active connection on the Ethernet port.

Ethernet transmit/receive activity LED

This LED is on the Ethernet connector. When this LED is lit, it indicates that there is activity between the server and the network.

Rear view

The following illustration shows the connectors on the rear of the server.
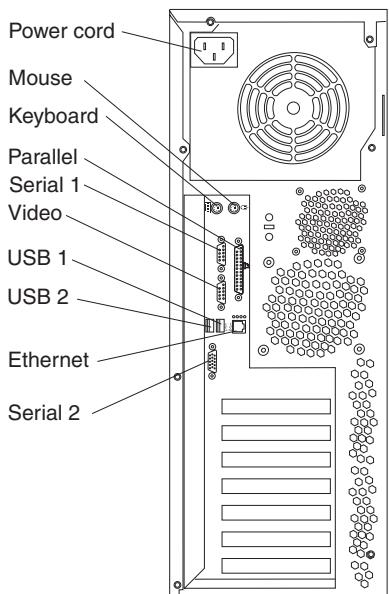
Power-cord connector
Connect the power cord to this connector.

Mouse connector
Connect a mouse or other PS/2 device to this connector.

Keyboard connector
Connect a PS/2 keyboard to this connector.

Parallel connector
Connect a parallel device to this connector.

Serial 1 connector
Connect a 9-pin serial device to this connector.

Video connector
Connect a monitor to this connector.

USB 1 connector
Connect a USB device to this connector.

USB 2 connector
Connect a USB device to this connector.

Ethernet connector
Use this connector to connect the server to a network.

Serial 2 connector
Connect a 9-pin serial device to this connector.

If you have an optional Remote Supervisor Adapter II (system-management adapter) installed in PCI-X slot 2, the server has additional connectors and LEDs. See the *Option Installation Guide* for more information about these connectors and LEDs. In addition, if you install the optional Remote Supervisor Adapter II, you must disconnect the video cable from the system board and connect it to the optional Remote Supervisor Adapter II.

Server power features

When the server is connected to an ac power source but is not turned on, the operating system does not run, and all core logic is shut down; however, the server can respond to remote requests to turn on the server. The power-on LED flashes to indicate that the server is connected to an ac power source but is not turned on (standby mode).

Turning on the server

Approximately 20 seconds after the server is connected to ac power, the power-control button becomes active, and you can turn on the server and start the operating system by pressing the power-control button.

The server can also be turned on in any of the following ways:

- If a power failure occurs while the server is turned on, the server will restart automatically when power is restored.
- If the server is connected to an Advanced System Management (ASM) interconnect network that contains at least one server with an optional Remote Supervisor Adapter II installed, the server can be turned on from the Remote Supervisor Adapter II user interface.
- If the operating system supports the systems-management software for an optional Remote Supervisor Adapter II, the systems-management software can turn on the server.
- If the operating system supports the Wake on LAN® feature, the Wake on LAN feature can turn on the server.
- If an optional Remote Supervisor Adapter II is installed in the server, the server can be turned on from the Remote Supervisor Adapter II user interface.

Note: When 4 GB or more of memory (physical or logical) is installed, some memory is reserved for various system resources and is unavailable to the operating system. The amount of memory that is reserved for system resources depends on the operating system, the configuration of the server, and the configured PCI options.

Turning off the server

When you turn off the server and leave it connected to ac power, the server can respond to remote requests to turn on the server. To remove all power from the server, you must disconnect it from the power source.

Some operating systems require an orderly shutdown before you turn off the server. See the operating-system documentation for information about shutting down the operating system.

Statement 5

CAUTION:
The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.
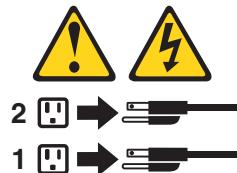
The server can be turned off in any of the following ways:

- You can turn off the server from the operating system, if the operating system supports this feature. After an orderly shutdown of the operating system, the server will be turned off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn off the server, if the operating system supports this feature.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the server.
- If the server is connected to an Advanced System Management (ASM) interconnect network that contains at least one system with an optional Remote Supervisor Adapter II installed, the server can be turned off from the Remote Supervisor Adapter II user interface.
- If an optional Remote Supervisor Adapter II is installed in the server, the server can be turned off from the Remote Supervisor Adapter II user interface.
- If the Wake on LAN feature turned on the server, the Wake on LAN feature can turn of the server.
- The server can turn itself off as an automatic response to a critical system failure.

Chapter 2. Configuring the server

Detailed information about configuring the server is in the IBM xSeries 206 *User's Guide*, on the IBM *xSeries Documentation* CD.

The latest information on these programs and the most recent device-driver files are available at www.ibm.com/pc/support.

The following configuration programs can be used to customize the server hardware:

- **Configuration/Setup Utility program**

  This program is part of the basic input/output system (BIOS) code that comes with the server. You can use this program to configure serial-port and parallel-port assignments, change the drive startup sequence, set the date and time, and set passwords. For information about how to start this utility, see "Using the Configuration/Setup Utility program."

- **Adaptec HostRAID configuration programs**

  For more information about the Adaptec® HostRAID™ configuration programs, see the IBM xSeries 206 *User's Guide* on the IBM *xSeries Documentation* CD.

- **Intel Gigabit Ethernet Utility program**

  The Intel Gigabit Ethernet Utility is part of the BIOS code in the server. You can use it to configure the network as a startable device, and you can customize where the network startup option appears in the startup sequence. Enable the Intel Gigabit Ethernet Utility from the Configuration/Setup Utility program.

- **ServeRAID Manager**

  ServeRAID Manager can be used as an installed program or in startable-CD mode. Detailed information about ServeRAID Manager is in the *User's Guide* on the IBM *xSeries Documentation* CD.

- **Boot Menu program**

  The Boot Menu program can temporarily redefine the first startup device. Detailed information about ServeRAID Manager is in the *User's Guide* on the IBM *xSeries Documentation* CD.

For more information about these programs, see "Configuring your server" in the *User's Guide* on the IBM *xSeries Documentation* CD.

Using the Configuration/Setup Utility program

The Configuration/Setup Utility program is part of the BIOS code. You can use it to:

- Change interrupt request (IRQ) settings
- Change the startup drive sequence
- Configure serial-port assignments
- Enable USB keyboard and mouse support
- Resolve configuration conflicts
- Set the date and time
- Set passwords and security settings

Complete the following steps to start the Configuration/Setup Utility program:

1. Turn on the server and watch the monitor screen.

2. When the message `Press F1 for Configuration/Setup` appears, press F1. If an administrator password has been set, you must type the administrator password to access the full Configuration/Setup Utility menu.

3. Follow the instructions on the screen.

For more information on using the Configuration/Setup Utility program, see the *User's Guide* on the IBM *xSeries Documentation* CD.

Using the Adaptec HostRAID configuration programs

Use the Adaptec RAID Configuration Utility programs and SCSISelect Utility (also referred to as IBM ServeRAID-7e) to add RAID levels 0 and 1 functionality to the integrated Serial ATA controller and the SCSI controller. Use these programs to:
- Configure a redundant array of independent disks (RAID) array
- View or change your RAID configuration and associated devices

Detailed information about using these programs is in the *User's Guide* on the IBM *xSeries Documentation* CD. Be sure to use these programs as described therein.

The latest information about these programs and the most recent device-driver files are available at www.ibm.com/pc/support.

Using the Intel Gigabit Ethernet Utility program

The Intel Gigabit Ethernet Utility program is part of the BIOS code in the server. You can use it to configure the network as a startable device, and you can customize where the network startup option appears in the startup sequence.

Complete the following steps to enable the Intel Gigabit Ethernet Utility program:
1. Turn on the server and watch the monitor screen.
2. When the message `Press F1 for Configuration/Setup` appears during startup, press F1.
3. From the Configuration/Setup Utility main menu, select **Devices and I/O Ports** and press Enter.
4. Select **System Board Ethernet PXE/DHCP** and use the Right Arrow (→) key to set it to **Enabled**.
5. Select **Save Settings** and press Enter.

For more information about using the Gigabit Ethernet Utility program, see the *User's Guide* on the IBM *xSeries Documentation* CD.

Using ServeRAID Manager

Use the ServeRAID Manager program to:
- Configure arrays
- View your RAID configuration and associated devices
- Monitor operation of your RAID controllers

Detailed information about using these programs is in the *User's Guide* on the IBM *xSeries Documentation* CD. Be sure to use these programs as described therein.

The latest information about these programs and the most recent device-driver files are available at www.ibm.com/pc/support.

Using the Boot Menu program

The Boot Menu program is a built-in, menu-driven configuration utility program that you can use to temporarily redefine the first startup device without changing settings in the Configuration/Setup Utility program.

Complete the following steps to use the Boot Menu program to change the startup sequence of your server:

1. Turn off the server.
2. Restart the server.
3. Press F12.
4. Select the startup device.

The next time the server is started, it returns to the startup sequence that is set in the Configuration/Setup Utility program.

Chapter 3. Diagnostics

This chapter provides basic troubleshooting information to help solve some common problems that might occur with the server.

If you cannot locate and correct the problem using the information in this chapter, see Appendix A, "Getting help and technical assistance," on page 105 for more information.

General checkout

Follow the checkout procedure for diagnosing hardware problems. Review the following information before performing the checkout procedure:

- Read the safety information beginning at "Safety information" on page 107.
- The diagnostic programs are on the *IBM Enhanced Diagnostics* CD. These programs are the primary method of testing the major components of the server: the system board, Ethernet controller, video controller, RAM, keyboard, mouse (pointing device), serial ports, hard disk drives, and parallel port. You can also use them to test some external devices. If you are not sure whether a problem is caused by the hardware or by the software, you can use the diagnostic programs to confirm that the hardware is working correctly.
- When you run the diagnostic programs, a single problem might cause several error messages. If you receive several error messages, correct the cause of the first error message. The other error messages might not occur the next time you run the diagnostic programs.
- Before running the diagnostic programs, you must determine whether the failing server is part of a shared hard disk drive cluster (two or more servers sharing external storage devices). If you suspect that it is part of a cluster, you can run all diagnostic programs except the ones that test the storage unit (that is, a hard disk drive in the storage unit) or the storage adapter that is attached to the storage unit. The failing server might be part of a cluster if any of the following conditions is true:
    - The customer identifies the failing server as part of a cluster.
    - One or more external storage units are attached to the failing server and at least one of the attached storage units is also attached to another server or unidentifiable device.
    - One or more servers are located near the failing server.
- **Important:**
    1. For servers that are part of a shared hard disk drive cluster, run one test at a time. Do not run any suite of tests, such as "quick" or "normal" tests, because this could enable the hard disk drive diagnostic tests.
    2. If more than one error code is displayed, correct the first error. The other error codes might not occur the next time you run the diagnostic programs.
    3. If the server is suspended and a POST error code is displayed, see "POST error codes" on page 80.
    4. If the server is suspended and no error message is displayed, see "Error symptoms" on page 86 and "Undetermined problems" on page 97.
    5. For information about power-supply problems, see "Power checkout" on page 22.
    6. For intermittent problems, check the error log; see "Diagnostic programs and error messages" on page 16.

Note: The system-error log is available on the xSeries 206 server only when the server contains an optional Remote Supervisor Adapter II.

Complete the following steps to perform the checkout procedure:

001   **IS THE SERVER PART OF A CLUSTER?**

YES. Schedule maintenance for the server. Shut down all servers related to the cluster. Run the storage test.

NO. Go to step **002** .

002   **IF THE SERVER IS NOT PART OF A CLUSTER:**

If the operating system is running, complete the following steps:

1. Check the system board for LEDs (see "Diagnostic LEDs" on page 19).
2. If the xSeries 206 server has an optional Remote Supervisor Adapter II, check the service processor system-error logs:
   a. If the system-error log indicates a damaged field replaceable unit (FRU), replace the FRU, and run the diagnostic programs to confirm that the problem has been solved.
   b. If the system-error log does not indicate a damaged FRU, see "Error symptoms" on page 86 and "Undetermined problems" on page 97.

If the operating system is not running, complete the following steps:

1. Check the system board for LEDs (see "Diagnostic LEDs" on page 19).
2. If the xSeries 206 server has an optional Remote Supervisor Adapter II, check the service processor system-error logs:
   a. If the system-error log indicates a damaged field replaceable unit (FRU), replace the FRU, and run the diagnostic programs to confirm that the problem has been solved.
   b. If the error log does not indicate a damaged FRU, check the operating-system event logs; if these logs do not specify a particular error, go to step 3.
3. Turn off the server and all external devices.
4. Check all cables and power cords.
5. Set all display controls to the middle position.
6. Turn on all external devices.
7. Turn on the server.
8. Watch the screen and the serial port for POST errors, and record any POST error messages that are displayed on the screen. If an error is displayed, look up the first error (see "POST error codes" on page 80).
9. Run the diagnostic programs (see "Starting the diagnostic programs and viewing the test log" on page 17).

003   **DID THE DIAGNOSTIC PROGRAMS START ?**

NO. Find the failure symptom in "Error symptoms" on page 86.

YES. Run the diagnostic programs (see "Starting the diagnostic programs and viewing the test log" on page 17).

If you receive an error, see Chapter 7, "Symptom-to-FRU index," on page 77.

If the diagnostics were completed successfully and you still suspect a problem, see "Undetermined problems" on page 97.

If the server does not turn on, see "Error symptoms" on page 86.

Diagnostic tools overview

The following tools are available to help you diagnose and solve hardware-related problems:

- **POST beep codes and error messages**

  The power-on self-test (POST) generates beep codes and messages to indicate successful test completion or the detection of a problem. See "Power-on self-test" for more information.

- **Diagnostic programs**

  The diagnostic programs are stored on the *IBM Enhanced Diagnostics* CD. These programs are the primary method of testing the major components of the server. See "Diagnostic programs and error messages" on page 16 for more information.

- **Error charts**

  These charts list problem symptoms and steps to correct the problem. See "Error charts" on page 18 for more information.

- **Symptom-to-FRU index**

  This index lists problem symptoms and steps to correct each problem. See Chapter 7, "Symptom-to-FRU index," on page 77 for more information.

Power-on self-test

When you turn on the server, the power on self-test (POST) performs a series of tests to check the operation of system components and some of the installed options.

If POST finishes without detecting any problems, the first window of the operating system opens or an application program appears.

If POST detects a problem, more than one beep might sound, and an error message appears on the screen.

Notes:

1. If you have a user password set, you must type the password and press Enter, when prompted, before the operating system will start.

2. A single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After you correct the cause of the first error message, the other error messages usually will be resolved the next time you run the test.

POST beep codes

POST generates beep codes to indicate successful completion or the detection of a problem.

- One short beep indicates the successful completion of POST.
- More than one beep indicates that POST detected a problem. For more information, see "Beep symptoms" on page 78.

If POST detects a problem (more than one beep sounds), an error message appears on the screen. See "Beep symptoms" on page 78 and "POST error codes" on page 80 for more information.

POST error messages

POST error messages can appear when a problem is detected during startup. For a complete list of POST messages, see "POST error codes" on page 80.

Diagnostic programs and error messages

The system diagnostic programs are on the *IBM Enhanced Diagnostics* CD. These programs are the primary method of testing the major components of the server.

An *IBM Enhanced Diagnostics* CD comes with the server. You can also download the latest version of the diagnostic programs from http://www.ibm.com/pc/support/ (see "Downloading the diagnostic program" on page 17).

The IBM Enhanced Diagnostic programs isolate problems from the server hardware and software. The programs run independently of the operating system and *must be run either from a CD or diskette*.

Diagnostic error messages indicate that a problem exists; they are not intended to be used to identify a failing part. Troubleshooting and servicing complex problems indicated by error messages should be performed by trained service personnel.

Sometimes the first error to occur causes additional errors. In this case, the server displays more than one error message. Always follow the suggested action instructions for the *first* error message that appears.

Error codes that might be displayed are listed at "Diagnostic error codes" on page 83.

Text messages

The diagnostic text message format is as follows:

`result test_specific_string`

where:

result   is one of the following results:

> **Passed**
> This test was completed without any errors.
>
> **Failed**
> This test discovered an error.
>
> **User Aborted**
> You stopped the test before it was completed.
>
> **Not Applicable**
> You attempted to test a device that is not present in the server.
>
> **Aborted**
> The test could not proceed because of the server configuration.
>
> **Warning**
> A possible problem was reported during the test (for example, a device that was to be tested is not installed).

test_specific_string
> is an error code or other information about the error.

Downloading the diagnostic program

Complete the following steps to download the latest image of the IBM Enhanced Diagnostics and create a startable Enhanced Diagnostics diskette or CD:

1. Go to http://www.ibm.com/pc/support/.

2. Download the diagnostics file for the server to a hard disk directory (not to a diskette).

   Note: If you intend to create a diagnostics CD, download the file with the extension .iso.

3. Go to a DOS prompt, and change to the directory where the file was downloaded.

4. If you are creating a diagnostics diskette, complete the following steps:

   a. Insert a blank high-density diskette into the diskette drive.

   b. Type *filename* a: (where *filename* is the name of the file you downloaded from the Web), and press Enter.

   The downloaded file is self-extracting when copied to the diskette. When the copy is completed, you have a startable or bootable IBM Enhanced Diagnostics diskette.

5. If you are creating a diagnostics CD, use a blank CD in conjunction with the software you generally use to create a startable or bootable CD.

Starting the diagnostic programs and viewing the test log

The IBM Enhanced Diagnostic programs isolate problems from the server hardware and software. The programs run independently of the operating system and *must be run either from a CD or diskette.* This method of testing is generally used when other methods are not accessible or have not been successful in isolating a problem suspected to be hardware related.

The test log records data about system failures and other pertinent information. The following sections describe the diagnostic procedure for the diagnostics CD and the diagnostics diskette.

Note: The system-error log is available on the xSeries 206 server only when the server has an optional Remote Supervisor Adapter II.

Using the diagnostics CD

To start the IBM Enhanced Diagnostics using the CD, complete the following steps:

1. Turn off the server and any peripheral devices.

2. Turn on all attached devices; then, turn on the server.

3. When you see `Press F1 For Configuration/Setup`, press the F1 key.

4. When the Configuration/Setup Utility menu appears, select **Start Options**.

5. From the **Start Options** menu, select **Startup Sequence**.

6. Note the device that is selected as the first startup device. Later, you must restore this setting.

7. Select **CD-ROM** as the first startup device.

8. Press Esc two times to return to the Configuration/Setup Utility menu.

9. Insert the IBM *Enhanced Diagnostics* CD in the CD-ROM drive.

10. Select **Save & Exit Setup** and follow the prompts. The diagnostics will load. Follow the instructions on the screen to run the diagnostics.

11. When the tests are completed, view the test log by selecting **Utility** from the top of the screen. You can save the test log to a file on a diskette or to the hard disk.

   Important: When you finish running the diagnostics and utilities, remove the CD from the CD-ROM drive and turn off the server. You must restore the first startup device to the original setting. Use steps 2 on page 17 through 8 on page 17 of this procedure to do this.

   The test-log data is maintained only while the diagnostic programs are active. When you exit from the diagnostic programs, the test log is cleared. Save the test log to a file on a diskette or to the hard disk if you want to refer to it later.

Using the diagnostic diskette

Complete the following steps to start the IBM Enhanced Diagnostics using the diagnostics diskette:

1. Turn off the server and any peripheral devices.
2. Insert the IBM Enhanced Diagnostics diskette into the external USB diskette drive.
3. Turn on all attached devices; then, turn on the server.
4. Follow the instructions on the screen.
5. When the tests are completed, view the test log by selecting **Utility** from the top of the screen. You can save the test log to a file on a diskette or to the hard disk.

   The test-log data is maintained only while the diagnostic programs are active. When you exit from the diagnostic programs, the test log is cleared. Save the test log to a file on a diskette or to the hard disk if you want to refer to it later.
6. When you have completed the diagnostics procedure, remove the diagnostic diskette from the diskette drive before restarting the server.

If the hardware passes the Enhanced Diagnostics but the problem persists during normal server operations, a software error might be the cause. If you suspect a software problem, refer to the information that comes with the software package.

Diagnostic error message tables

For descriptions of the error messages that might appear when you run the diagnostic programs, see "Diagnostic error codes" on page 83.

Note: Depending on the configuration, some of the error messages might not appear when you run the diagnostic programs.

Error charts

Use the error charts to find solutions to problems that have definite symptoms (see "Error symptoms" on page 86).

Small computer system interface (SCSI) messages (some models)

If the server has an Ultra320 SCSI adapter and you receive a SCSI error message, see "SCSI error codes" on page 96.

Note: If the server does not have a SCSI hard disk drive, ignore any message that indicates that the BIOS code is not installed.

Diagnostic LEDs

The system board has diagnostic LEDs for microprocessors, fans, and memory that will help to locate the source of an error. Run the diagnostic programs (see "Starting the diagnostic programs and viewing the test log" on page 17) to find out the cause of the error.

DIMM 3 error LED   DIMM 2 error LED

DIMM 4 error LED   DIMM 1 error LED

Microprocessor
fan error LED

System fan 2
error LED

System fan 1
error LED

Standby power
LED
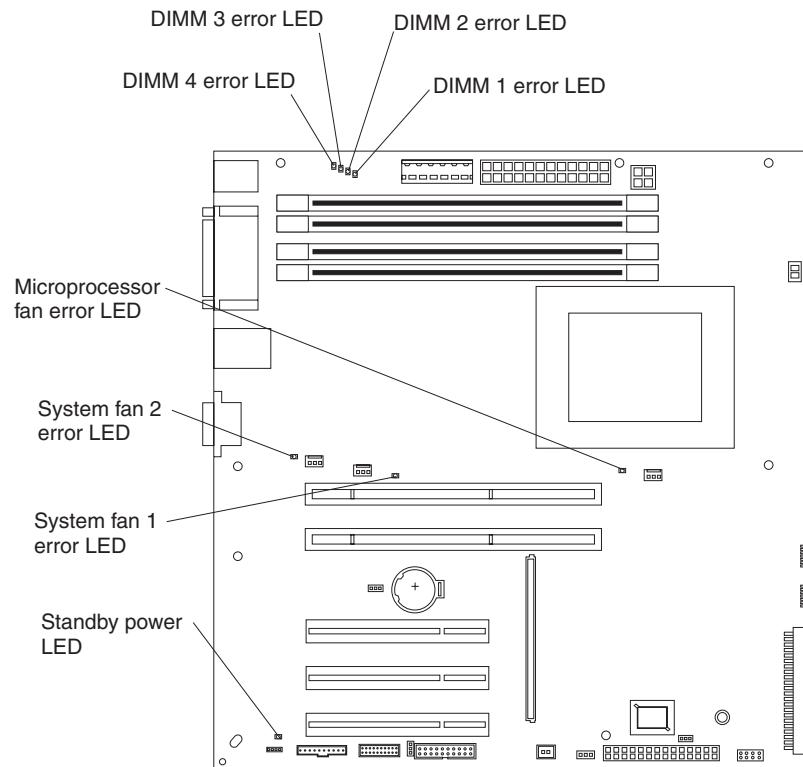
Each LED labeled as an "error" LED in the illustration above is lit to indicate a problem with a specific component. After a problem is corrected, its LED will not be lit the next time the server is restarted; if the problem remains, the LED will be lit again.

Note: It is normal for the standby power LED to be lit when the server is connected to ac power, regardless of whether the server is on or off. When the server is connected to ac power and the LED is not lit, it indicates a power problem.

For information about correcting errors indicated by these LEDs, see "System board LEDs" on page 85.

Updating BIOS code

You can update the BIOS code by using the diskette drive or by using a Linux or Windows® update package (if available).

The most current level of BIOS code for the server is available at http://www.ibm.com/pc/support/. You can update the BIOS code for the server through one of the following methods:

• Downloading the latest BIOS code from the IBM Web site, creating an update diskette, and using the diskette drive to install the BIOS code.
• Installing an update package for the Linux or Microsoft® Windows operating system, if available.

Recovering from a POST/BIOS update failure

If power to the server is interrupted while POST/BIOS code is being updated (flash update), the server might not restart correctly or might not display video (no video). If this happens, complete the following steps to recover:

1. Review the safety information beginning at "Safety information" on page 107 and "Handling static-sensitive devices" on page 24.
2. Turn off the server and all attached devices.
3. Disconnect the power cord and all external cables.
4. Remove the side cover and support bracket (see "Removing the side cover" on page 26 and "Removing and installing the support bracket" on page 28).
5. Locate the boot block recovery jumper (JP1) on the system board, removing any adapters that impede access to the jumper. The following illustration shows the location of the jumper on the system board.

Boot block jumper (JP1)

CMOS jumper (JP2)
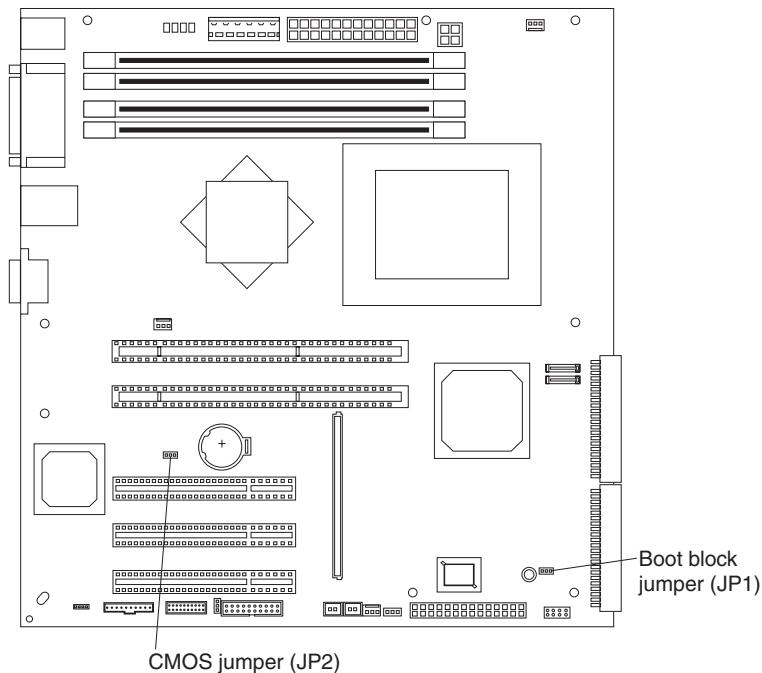
6. Remove the boot block recovery jumper from pins 1 and 2.
7. Replace any adapters that were removed; then, replace the support bracket and replace the side cover (see "Removing and installing the support bracket" on page 28 and "Replacing the side cover" on page 50).
8. Connect the server to a power source, keyboard, monitor, and mouse.
9. Insert the POST/BIOS update (flash) diskette into the diskette drive. You can download a file to create this diskette from http://www.ibm.com/pc/support/.
10. Turn on the server and the monitor.
11. After the update session is completed, turn off the server and monitor.
12. Remove the diskette from the diskette drive.
13. Disconnect all power cords and external cables; then, remove the server cover.
14. Return the boot block recovery jumper to pins 1 and 2.
15. Reinstall the server cover; then, reconnect all external cables and power cords and turn on the peripheral devices.
16. Turn on the server to restart the operating system.

Erasing a lost or forgotten password (clearing CMOS memory)

This section applies to lost or forgotten passwords. For more information about lost or forgotten passwords, see the *User's Guide*.

Complete the following steps to set the CMOS recovery jumper and erase a forgotten password:

1. Review the safety information beginning at "Safety information" on page 107 and "Handling static-sensitive devices" on page 24.

2. Turn off the server and all attached devices.

3. Disconnect the power cord.

4. Remove the side cover and support bracket (see "Removing the side cover" on page 26 and "Removing and installing the support bracket" on page 28).

5. Locate the CMOS recovery jumper (JP2) on the system board, removing any adapters that impede access to the jumper. The illustration in "Recovering from a POST/BIOS update failure" on page 20 shows the location of the jumper on the system board.

6. Move the CMOS recovery jumper from pins 1 and 2 to pins 2 and 3.

7. Wait 60 seconds; then, return the CMOS recovery jumper to pins 1 and 2

8. Replace any adapters that were removed; then, replace the support bracket and replace the side cover (see "Removing and installing the support bracket" on page 28 and "Replacing the side cover" on page 50).

   You can now start the server one time without having to use the user password, and use the Configuration/Setup Utility program to either delete the old password or set a new user password. If you do not change or delete the password, the next time you start the server, the original user password will be reinstated.

9. Connect the server to a power source, keyboard, monitor, and mouse.

10. Turn on the server. The Configuration/Setup Utility program starts.

11. Follow the instructions to erase the existing password or create a new password.

12. Select **Save Settings** and press Enter.

Power checkout

Power problems can be difficult to solve. For example, a short circuit can exist anywhere on any of the power-distribution buses. Usually, a short circuit will cause the power subsystem to shut down because of an overcurrent condition.

A general procedure for troubleshooting power problems is as follows:

1. Turn off the server, and disconnect all ac power cords.
2. Check for loose cables in the power subsystem. Also check for short circuits, for example, if there is a loose screw causing a short circuit on a circuit board.
3. Remove adapters and disconnect the cables and power connectors to all internal and external devices until the server is at the minimum configuration required to start the server (see "Minimum operating requirements" on page 97).
4. Reconnect all ac power cords and turn on the server. If the server starts successfully, replace adapters and devices one at a time until the problem is isolated. If the server does not start from the minimal configuration, replace FRUs of the minimal configuration one at a time until the problem is isolated.

To use this method, you must know the minimum configuration that is required for the server to start (see page 97).

Chapter 4. Installing options

This chapter provides detailed instructions for adding hardware options to the server.

Installation guidelines

Before you begin installing options in the server, read the following information:

- Review the safety information beginning at "Safety information" on page 107 and the guidelines in "Handling static-sensitive devices" on page 24. This information will help you work safely with the server and options.
- When you need to access the inside of the server to install options, you might find it easier to lay the server on its side.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices that you will connect to the server.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- You do not need to turn off the server to install or replace hot-swap drives, or hot-plug Universal Serial Bus (USB) devices.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing and installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- For a list of supported options for the server, go to http://www.ibm.com/pc/us/compat/.

System reliability guidelines

To help ensure proper cooling and system reliability, make sure that:

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.

  When installing the server in a rack, make sure that space is available around the server to enable the server cooling system to work properly. See the documentation that comes with the rack for additional information.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.
- You have replaced a hot-swap drive within 2 minutes of its removal.

Handling static-sensitive devices

Attention: Static electricity can damage electronic devices, including the server. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

To reduce the possibility of electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal part of the server for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the server without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the server cover or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Major components of the xSeries 206 Type 8482 and 8487 server

Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.

Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.

The following illustration shows the major components in the server.

Note: The illustrations in this document might differ slightly from your hardware.
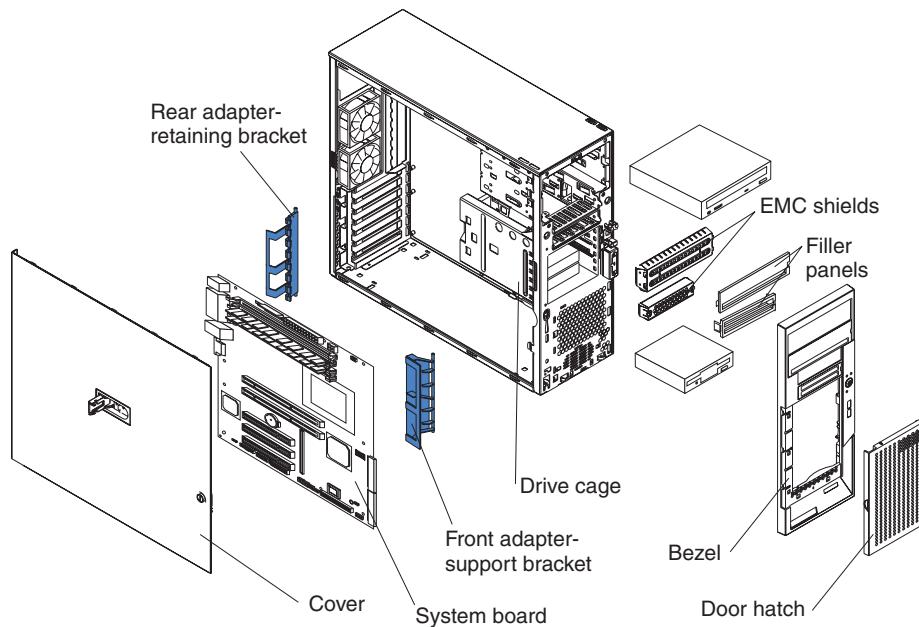
Removing the side cover

Complete the following steps to remove the server side cover:

1. Read "Installation guidelines" on page 23 and the safety information beginning at "Safety information" on page 107.
2. Turn off the server and all attached devices (see "Turning on the server" on page 7); then, disconnect all power cords and external cables.
3. Lay the server on its side.
4. Unlock the side cover; then, pull the cover-release latch away from the server, and push the cover toward the rear of the server. Lift the side cover off the server and set it aside.

Cover-release
latch

Key lock
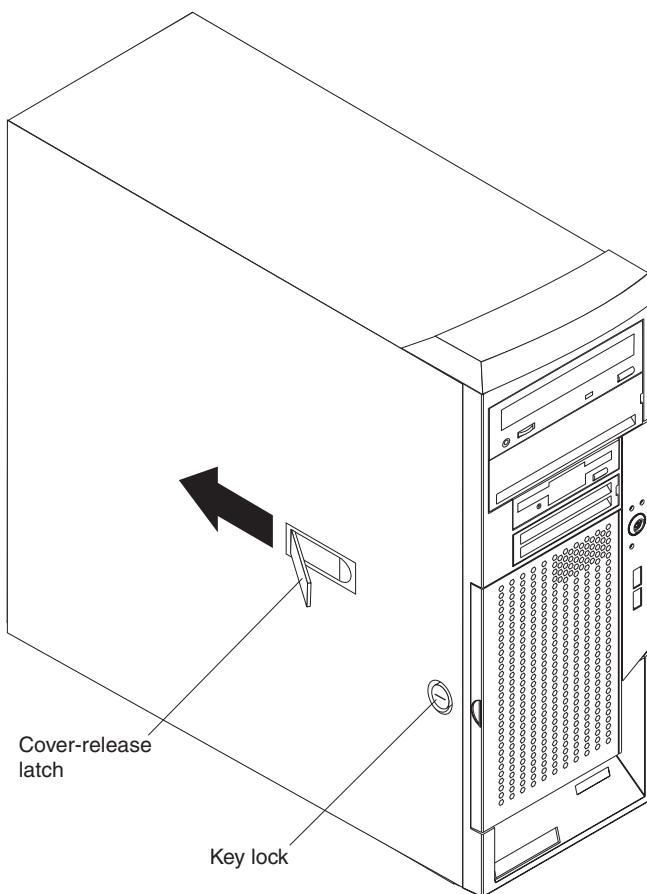
To replace the side cover, see "Replacing the side cover" on page 50.

Attention: For proper cooling and airflow, replace the cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the cover removed might damage server components.

Removing the bezel

When working with some devices, such as additional optical drives, you must first remove the bezel to access the device.

Complete the following steps to remove the bezel:

1. Unlock the side-cover lock.
2. Remove the side cover (see "Removing the side cover" on page 26).
3. Locate the bezel-release lever; then, press the bezel-release lever toward the front of the server.
4. Pull the top of the bezel away from the chassis; then, push the bezel down to disengage the bottom tabs.
5. Remove the bezel from the server and store the bezel in a safe place.
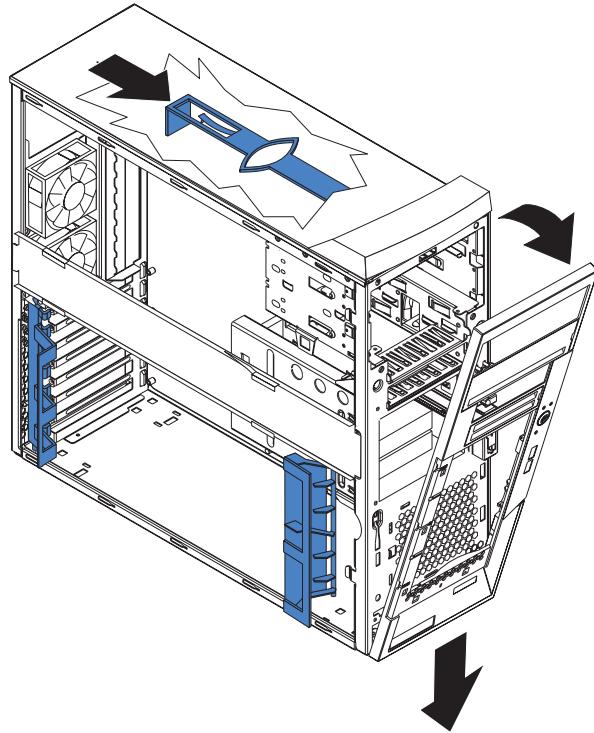
For instructions for replacing the bezel, see "Replacing the bezel" on page 50.

Removing and installing the support bracket

When working with some devices, such as hard disk drives, adapters, and memory modules, you must first remove the support bracket to access the device.

Complete the following steps to remove the support bracket:

1. Read "Installation guidelines" on page 23 and the safety information beginning at "Safety information" on page 107.
2. Remove the side cover ("Removing the side cover" on page 26).
3. Pull out on the rear end of the support bracket at a 45° angle.
4. Disengage the front end of the support bracket from the server and set the bracket aside.
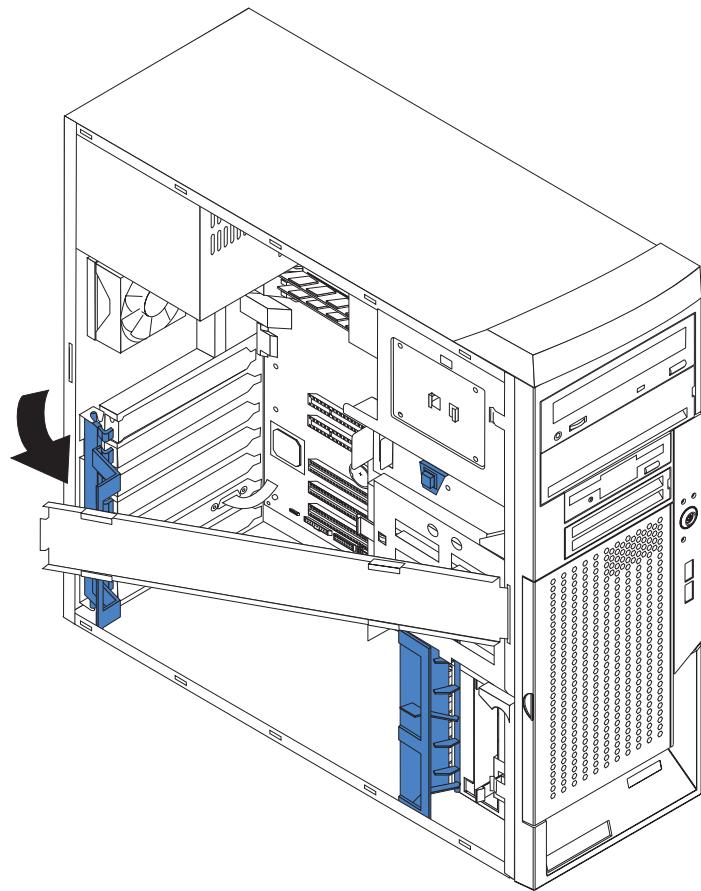
To reinstall the support bracket, reverse the previous steps.

Installing a memory module

The following notes describe the types of dual inline memory modules (DIMMs) that the server supports and other information that you must consider when installing DIMMs:

- The server supports industry-standard PC2700 and PC3200 double-data-rate (DDR) dual inline memory modules (DIMMs).
- The system board contains four DIMM connectors and supports two-way memory interleaving.
- The DIMM options available for the server are 256 MB, 512 MB, and 1 GB. The server supports a minimum of 256 MB and a maximum of 4 GB of system memory.
- The amount of usable memory will be reduced depending on the system configuration. A certain amount of memory must be reserved for system resources. The BIOS will display the total amount of installed memory and the amount of configured memory.
- The server comes with one 256 MB or 512 MB DIMM installed in the DIMM 1 memory connector. If the server has one DIMM installed, when you install an additional DIMM, it must be installed in the DIMM 3 memory connector, and it must be the same size, speed, type, and technology as the DIMM that you installed in the DIMM 1 memory connector. You can mix compatible DIMMs from various manufacturers. When one DIMM is installed, the server runs as a single-channel server. When you add a DIMM in DIMM 3 memory connector, the server becomes a dual-channel server.
- DIMMs must be installed in matched pairs. The first pair of DIMMs you install in DIMM 1 and DIMM 3 memory connectors must be the same size, speed, type, and technology. You can mix compatible DIMMs from various manufacturers. If you install a second pair of DIMMs in DIMM 2 and DIMM 4 memory connectors, they do not have to be the same size, speed, type, and technology as the DIMMs installed in the DIMM 1 and DIMM 3 memory connectors. However, the size, speed, type, and technology of the DIMMs you install in DIMM 2 and DIMM 4 memory connectors must match each other.

   Note: Installing a third DIMM without installing a fourth DIMM to make a pair is not supported.
- Install only 2.5 V, 184-pin, double-data-rate (DDR), PC2700 or PC3200, unbuffered synchronous dynamic random-access memory (SDRAM) with error correcting code (ECC) DIMMs. These DIMMs must be compatible with the latest PC2700 and PC3200 SDRAM unbuffered DIMM specification. For a list of supported options for the server, go to http://www.ibm.com/us/compat/; then, select your country and navigate to the list of options for the server.
- When you restart the server after adding or removing a DIMM, the server displays a message that the memory configuration has changed.

Complete the following steps to install a DIMM:

1. Read "Installation guidelines" on page 23 and the safety information beginning at "Safety information" on page 107.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the side cover (see "Removing the side cover" on page 26).
4. Remove the support bracket (see "Removing and installing the support bracket" on page 28).

5. Locate the DIMM connectors on the system board. Determine the connectors into which you will install the DIMMs. Install the DIMMs in the sequence shown in the following table.

Memory installation sequence	
DIMMs	**Slots**
1 DIMM	1
2 DIMMs	1, 3
3 DIMMs	Not supported
4 DIMMs	1, 2, 3, 4

Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.

6. Open the retaining clips and, if necessary, remove any existing DIMM.
7. Touch the static-protective package containing the DIMM to any unpainted metal surface on the server. Then, remove the new DIMM from the package.
8. Turn the DIMM so that the DIMM keys align correctly with the slot.
9. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector. If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly installed. Open the retaining clips, remove the DIMM, and then reinsert it.
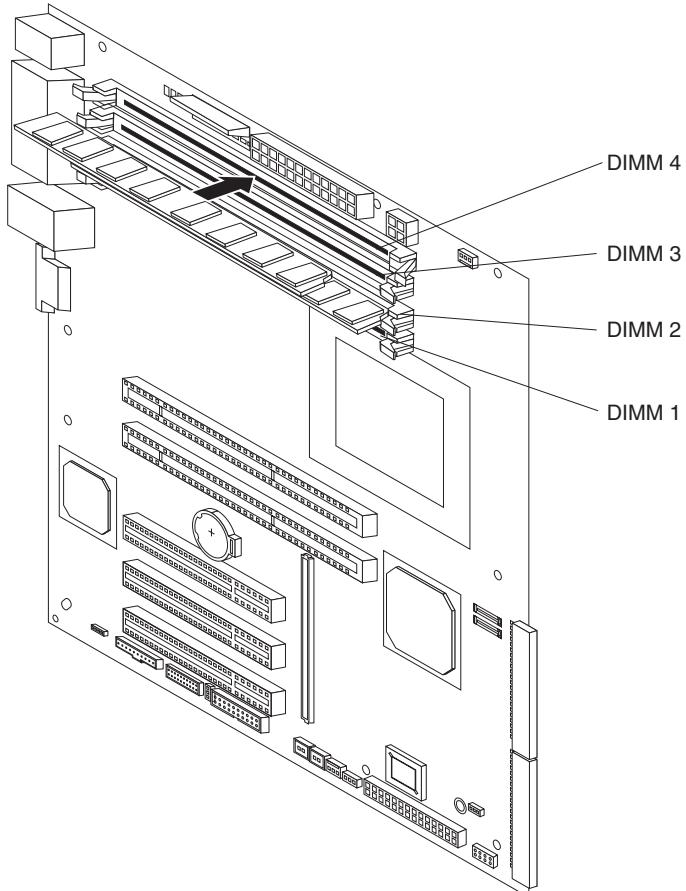
10. If you have other options to install or remove, do so now; otherwise, replace the support bracket (see "Removing and installing the support bracket" on page 28) and go to "Completing the installation" on page 50.

Installing a drive

Depending on the server model, one or more of the following drives might be installed in the server:

- Diskette
- Hard disk drive
- CD-ROM, CD-RW, or DVD/CD-RW combo

For information on replacing a CD-ROM drive or diskette drive, see "Replacing the CD-ROM drive in bay 2" on page 35 and "Replacing the diskette drive in bay 3" on page 36.

Some hot-swap models come with an IDE CD-ROM drive in bay 1, a 3.5-in., 1.44 MB diskette drive in bay 3, and three hot-swap hard disk drive bays.

Some non-hot-swap models come with an IDE CD-ROM drive in bay 1, a 3.5-in., 1.44 MB diskette drive in bay 3, and a SCSI hard disk drive in bay 7.

Some simple-swap Serial ATA models come with an IDE CD-ROM drive in bay 1, a 3.5-in., 1.44 MB diskette drive in bay 3, and a simple-swap Serial ATA hard disk drive in bay 7.
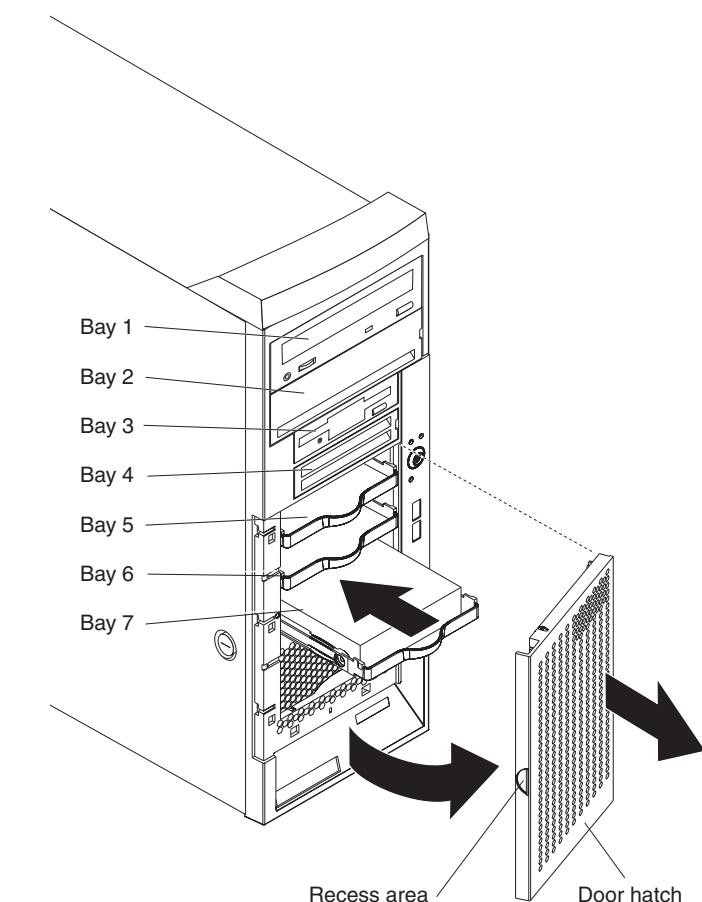
The following notes describe the types of drives that the server supports and other information that you must consider when installing a hard disk drive:

- Read the safety information beginning at "Safety information" on page 107, "Installation guidelines" on page 23, and the documentation that comes with the drive.
- Make sure that you have all the cables and other equipment specified in the documentation that comes with the drive.
- Select the bay in which you want to install the drive.
- Check the instructions that come with the drive to see if you need to set any switches or jumpers on the drive. If you are installing a SCSI device, be sure to set the SCSI ID for that device.
- Diskette drives, tape drives, CD-ROM, CD-RW, and DVD drives are examples of removable-media drives. You can install removable-media drives in bays 1, 2, 3, and 4 only.
- The integrated IDE controller in the server supports the connection of up to two IDE devices.
- You can install a 3.5-in. slim-high or 5.25-in. half-high removable-media drive, such as a tape backup drive, CD-RW, or DVD drive, in bay 2.
- The server supports only one diskette drive.
- To install a 3.5-in. drive in a 5.25-in. bay, you must use the 5.25-in. conversion kit, available separately.
- The electromagnetic interference (EMI) integrity and cooling of the server are protected by having all bays and PCI slots covered or occupied. When you install a drive or PCI adapter, save the EMC shield and filler panel from the bay or the PCI adapter slot cover in the event you later remove the option.
- For a complete list of supported options for the server, go to http://www.ibm.com/pc/support/.

Installing a drive in bay 2 or 4

This section describes how to install a drive in bay 2 or bay 4.

Note: A second IDE device which is intended to be cabled to the CD-ROM drive in bay 1 can be installed only in bay 2.

Complete the following steps to install a drive in bay 2 or 4:

1. Read "Installation guidelines" on page 23 and the safety information beginning at "Safety information" on page 107.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Remove the side cover (see "Removing the side cover" on page 26).
4. Remove the support bracket (see "Removing and installing the support bracket" on page 28).
5. Remove the bezel (see "Removing the bezel" on page 27).
6. Use a screwdriver to pry the filler panel and EMC shield away from the server.

   Note: If you are installing a drive that contains a laser, observe the following safety precaution.

Statement 3

CAUTION:
When laser products (such as CD-ROMs, DVD-ROM drives, fiber optic devices, or transmitters) are installed, note the following:
• **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
• **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

DANGER

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following:

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.
Class 1 Laser Product
Laser Klasse 1
Laser Klass 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1
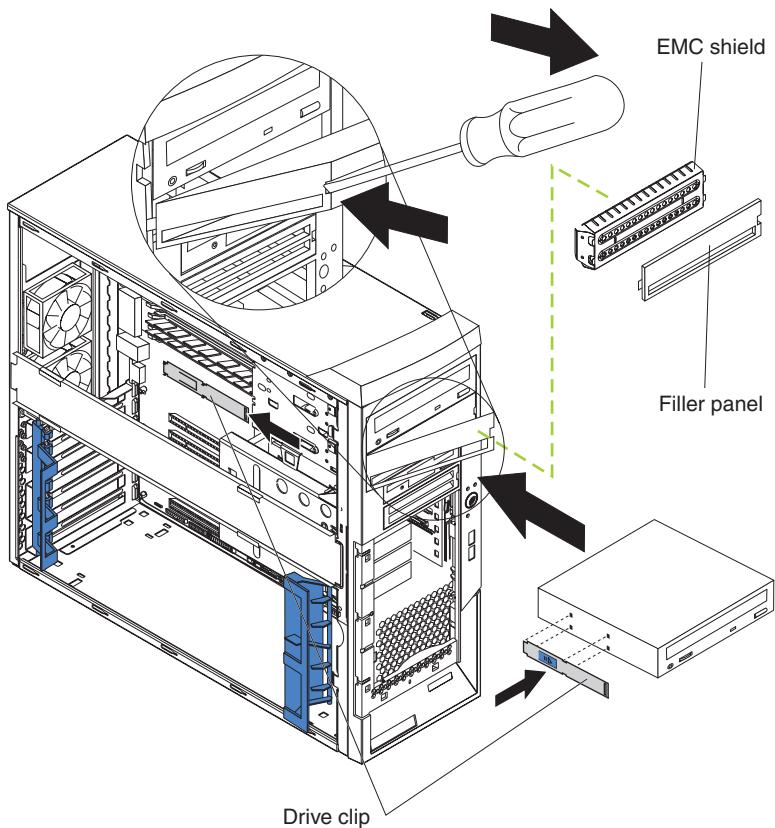
EMC shield

Filler panel

Drive clip

7. Touch the static-protective package containing the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.

8. Set any jumpers or switches on the drive according to the documentation that comes with the drive.

   Note: You might find it easier to install the new drive from the front, and then attach the cables.

9. Remove the clip from the side of the drive cage of bays 1 and 2. Slide the clip to the left to remove it from the drive cage; then, snap the clip into the screw holes on the side of the drive (the blue side of the clip should be facing outward).

10. If you are installing a 5.25-in. drive in bay 2, push the drive into the bay. If you are installing a 3.5-in. drive in bay 2, you must attach the 5.25-in. conversion kit, available separately, to the 3.5-in. drive.

    Note: Only a 3.5-in. device can be installed in bay 4.

11. Determine whether the drive is an IDE or SCSI device; then, connect one end of the applicable signal cable into the back of the drive and make sure that the other end of this cable is connected into the applicable IDE or SCSI connector on the system board.

12. Route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor and memory.

13. If you have another drive to install or remove, do so now.

14. Connect the power cable to the back of the drive. The connectors are keyed and can be inserted only one way.

15. If you have other options to install or remove, do so now; otherwise, replace the support bracket (see "Removing and installing the support bracket" on page 28), replace the bezel (see "Replacing the bezel" on page 50), and then go to "Completing the installation" on page 50.

Replacing the CD-ROM drive in bay 2

Complete the following steps to remove a CD-ROM drive:

1. Read "Installation guidelines" on page 23, "Handling static-sensitive devices" on page 24, and the safety information beginning at "Safety information" on page 107.
2. Turn off the server and all attached devices.
3. Disconnect all power cords; then, disconnect all external cables.
4. Remove the cover (see "Removing the side cover" on page 26).
5. Disconnect the CD-ROM drive connectors and cables.

   Note: The illustrations in this document might differ slightly from your hardware.
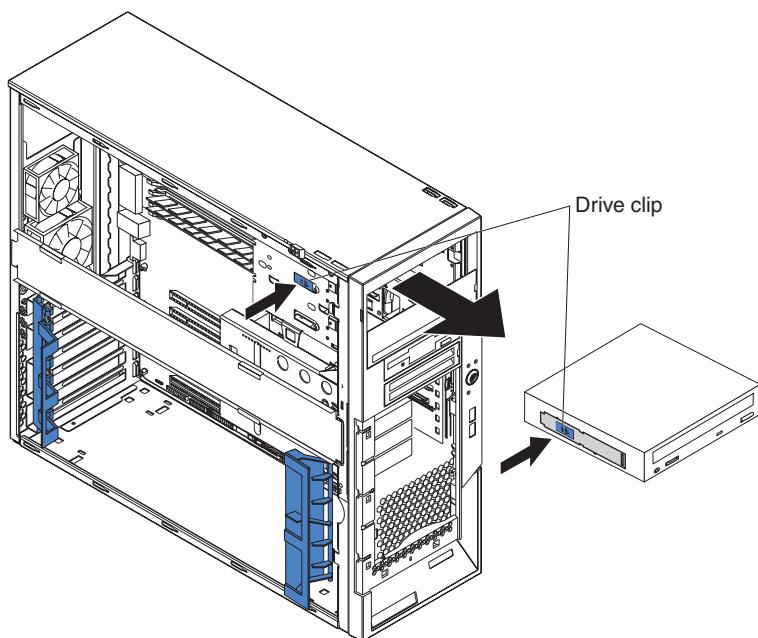
Drive clip

6. Press the blue latch in the direction of the arrow to release the drive; then, while pressing the latch, grasp the CD-ROM drive from the front and pull it through the aperture in the front of the server.
7. Remove the clip from the side of the CD-ROM drive and snap it into the screw holes on the side of the new CD-ROM drive, making sure that the blue side of the clip is facing outward and the arrow on the clip is pointing toward the front of the drive.

To install the CD-ROM drive, reverse the previous steps.

Note: If you are installing a new CD-ROM drive, read the instructions that come with the drive and verify whether any switches or jumpers need to be set on the drive, and whether a SCSI ID needs to be set.

Replacing the diskette drive in bay 3

Complete the following steps to replace a diskette drive:

1. Read "Installation guidelines" on page 23, "Handling static-sensitive devices" on page 24, and the safety information beginning at "Safety information" on page 107.

2. Turn off the server and all attached devices.

3. Disconnect all power cords; then, disconnect all external cables.

4. Remove the cover (see"Removing the side cover" on page 26).

5. Disconnect the diskette drive connectors and cables.

    Note: The illustrations in this document might differ slightly from your hardware.
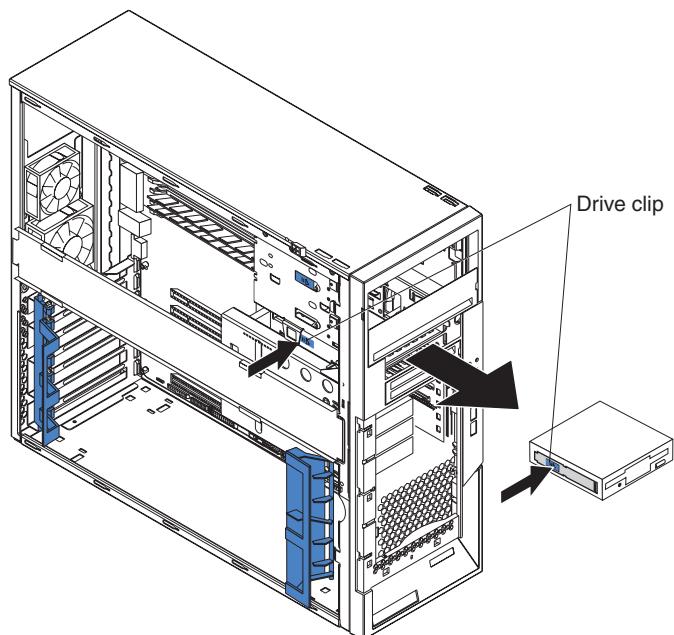
6. Press on the blue latch in the direction of the arrow to release the drive; then, while pressing the latch, grasp the diskette drive from the front and pull it through the aperture in the front of the server.

7. Remove the clip from the side of the diskette drive and snap it into the screw holes on the side of the new diskette drive, making sure that the blue side of the clip is facing outward and the arrow on the clip is pointing toward the front of the drive.

    To install the diskette drive, reverse the previous steps.

Installing a hot-swap SCSI hard disk drive in bay 5, 6, or 7

Some server models come with hot-swap hard disk drives. Before you install a hot-swap hard disk drive, read the following information:

- Inspect the drive tray for signs of damage.
- Make sure that the drive is correctly installed in the tray.
- To maintain proper system cooling, do not operate the server for more than 10 minutes without either a drive or a filler panel installed in each drive bay.
- All hot-swap drives being used in the server must have the same speed rating; mixing speed ratings will cause all drives to operate at the speed of the slowest drive.

- You do not have to turn off the server to install hot-swap drives in the hot-swap drive bays; however, you may need to restart the server so that the hot-swap drive will be recognized and reconfigured.
- Install hot-swap hard disk drives in this sequence: bay 7, bay 6, and bay 5.
- If the server has an optional RAID adapter, see the documentation that comes with the adapter for instructions for installing a hard disk drive.
- Each hot-swap drive has two LEDs: the hard disk drive activity LED and the hard disk drive status LED. When the green hard disk drive activity LED is flashing, it indicates that the controller is accessing the hard disk drive. When the amber hard disk drive status LED is lit continuously, it indicates that the drive is faulty and must be replaced.

The server hot-swap bays are connected to a hard disk drive backplane. This backplane is the printed circuit board behind the bay. The backplane controls the SCSI IDs for the hot-swap drives.

The following illustration shows the location of the components on the hot-swap-drive backplane as seen from the front of the server drive cage.
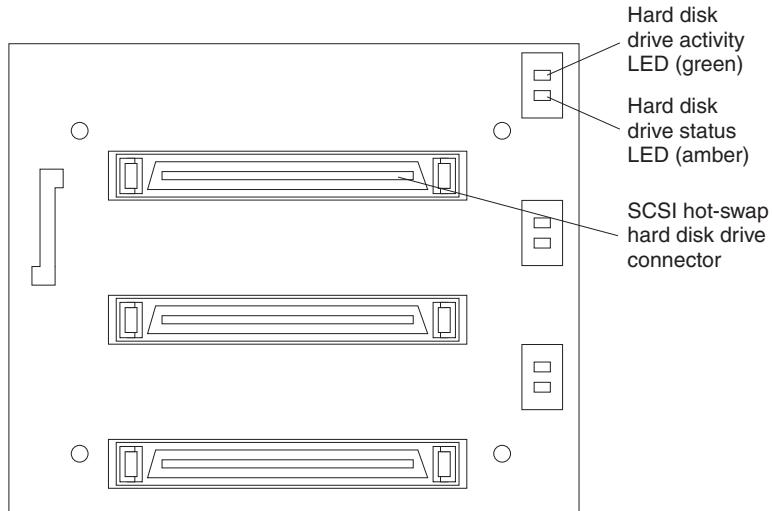
The following illustration shows the rear connectors on the hot-swap-drive backplane as seen from the rear of the server drive cage.
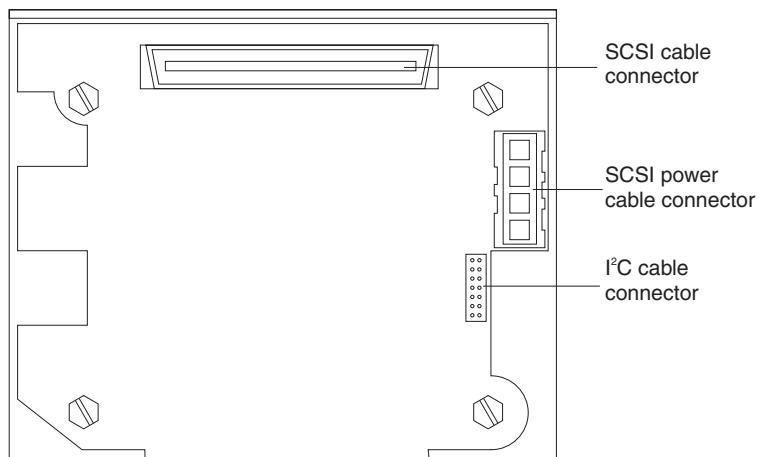
Complete the following steps to install a hot-swap hard disk drive:

1. Read "Installation guidelines" on page 23 and the safety information beginning at "Safety information" on page 107.

2. Turn off the server and peripheral devices and disconnect all power cords and external cables.

   Note: If the server is configured for RAID operation, the installed drive may not be recognized and reconfigured by RAID until the server is turned off and turned back on.

3. Unlock the side cover.

4. Slide the drive-bay lock bar to the left to access the drive bays.

5. Remove the filler panel from one of the empty hot-swap bays by inserting your finger into the depression at the left side of the filler panel and pulling it away from the server.

6. Touch the static-protective package containing the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.

7. Install the hard disk drive in the hot-swap bay:

   a. Make sure that the tray handle is open (that is, perpendicular to the drive).

   b. Align the drive assembly with the guide rails in the bay.

   c. Gently slide the drive assembly into the drive bay until the drive stops.

Filler panel

Drive tray assembly

Drive tray handle (in open position)

Drive bay lock-bar
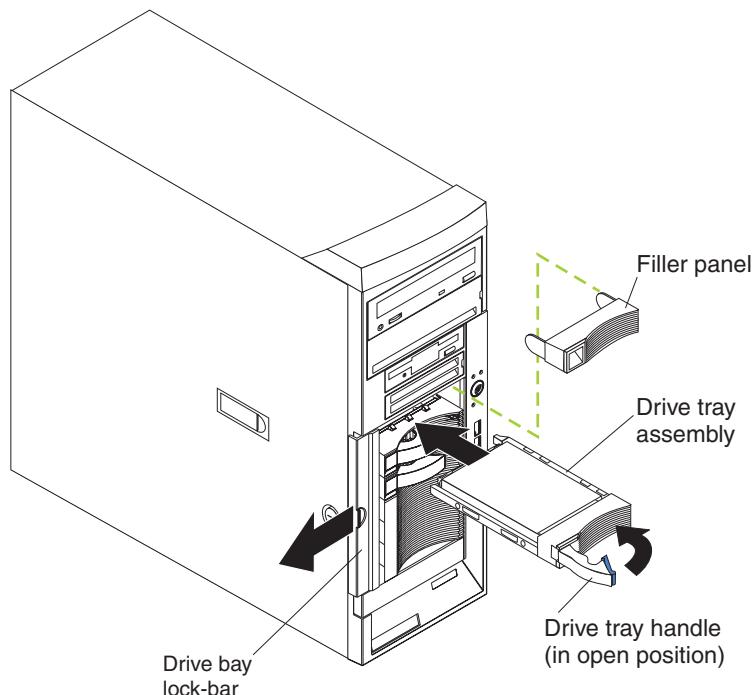
   d. Push the tray handle to the closed (locked) position.

   Note: If your server is configured for RAID operation using an optional ServeRAID controller, you might have to reconfigure your disk arrays after installing hard disk drives. See the ServeRAID documentation on the *IBM ServeRAID Support* CD for additional information about RAID operation and complete instructions for using ServeRAID Manager.

8. If you are installing additional hot-swap hard disk drives, do so now.

9. If you have other options to install or remove, do so now; otherwise go to "Completing the installation" on page 50.

After turning on the server, check the hard disk drive status indicator to make sure that the hard disk drive is operating correctly. If the amber hard disk drive status LED for a drive is lit continuously, it indicates that the drive is faulty and must be replaced. If the green hard disk drive activity LED is flashing, it indicates that the drive is being accessed.

SCSI IDs for hot-swap hard disk drives

The hot-swap-drive backplane controls the SCSI IDs for the internal hot-swap drive bays. The SCSI ID for each hot-swap hard disk drive is printed on the hot-swap lock bar. The following table lists the SCSI IDs for the hard disk drives and backplane that are connected to one channel in hot-swap hard disk drive models. In the typical configuration, the standard hard disk drives and backplane are connected to channel A.

| Device	SCSI ID
AIC 7901 controller (mini-PCI-X slot)	7
Hot-swap backplane	9
Drive bay 7	12
Drive bay 6	13
Drive bay 5	14

Installing a non-hot-swap SCSI hard disk drive in bay 4, 5, 6, or 7

Some server models come with non-hot-swap SCSI hard disk drives. Before you install a non-hot-swap SCSI hard disk drive, read the following information:

• Read the documentation that comes with the drive for cabling instructions.
• Route the cable before you install the drive. Do not block the airflow from the fans.
• You can install up to four non-hot-swap SCSI hard disk drives in the server.
• Install non-hot-swap SCSI hard disk drives in this sequence: bay 7, bay 6, bay 5, and bay 4. See "Installing a drive in bay 2 or 4" on page 32 for information on how to install a hard disk drive in bay 4.

Complete the following steps to install a non-hot-swap SCSI hard disk drive:

1. Read "Installation guidelines" on page 23 and the safety information beginning at "Safety information" on page 107.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Unlock and remove the side cover (see "Removing the side cover" on page 26).
4. Remove the support bracket (see "Removing and installing the support bracket" on page 28).
5. Grasp the recessed area on the door hatch and rotate the door hatch outward until it disengages from the server.

Bay 1
Bay 2
Bay 3
Bay 4
Bay 5
Bay 6
Bay 7

Recess area   Door hatch
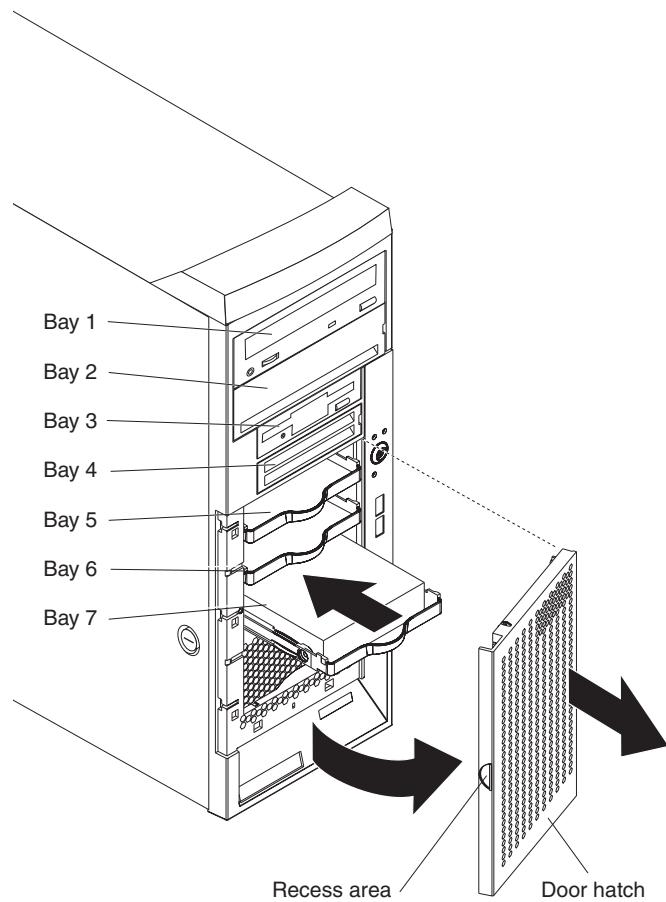
6. Remove the empty drive tray from the drive bay in which you want to install the drive.

7. Touch the static-protective package containing the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.

8. Set any jumpers or switches on the drive according to the documentation that comes with the drive.
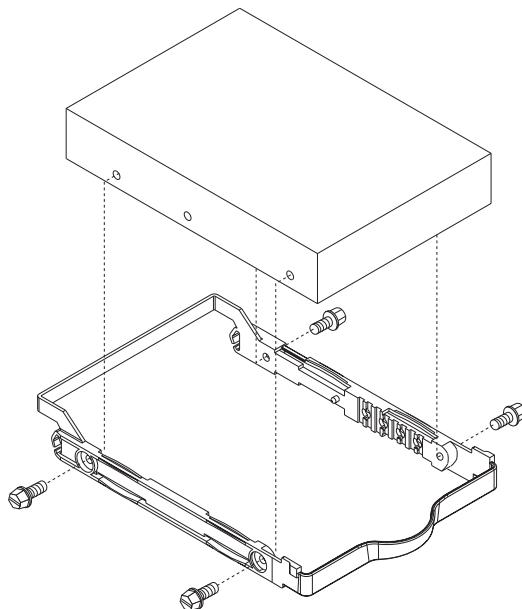
9. Attach the hard disk drive to the drive tray with the four screws that are attached to the drive tray (use the plastic pins on the drive tray to help line up the drive with the drive tray screw holes).

10. Align the drive assembly with the guide rails in the bay (the connector end of the drive goes in first).

11. Gently slide the drive assembly into the drive bay as far as it will go.

12. Connect one end of the SCSI signal cable into the back of the drive and make sure that the other end of this cable is connected into the SCSI connector on the system board. See "Power and signal cables for internal drives" on page 43 for additional information about cabling drives and "System-board internal connectors" on page 70 for the location of the SCSI connectors on the system board. If there are open connectors on the cables connecting existing SCSI drives, you can use these cables to connect the new drive.

13. Route the signal cable so that it does not block the airflow to the rear of the drives or over the microprocessor and memory.

14. Connect the power cable to the back of the drive. The connectors are keyed and can be inserted only one way.

15. If you have other options to install or remove, do so now. Otherwise, close the door hatch, close the drive-bay lock bar, replace the support bracket (see "Removing and installing the support bracket" on page 28), and replace the side cover (see "Replacing the side cover" on page 50); then, go to "Completing the installation" on page 50.

Installing a simple-swap Serial ATA hard disk drive in bay 5, 6, or 7

Some server models come with simple-swap Serial ATA (SATA) hard disk drives, which are easily accessible from the front of the server. Before you install a simple-swap SATA hard disk drive, read the following information:

• Read the documentation that comes with the drive for cabling instructions.

• Route the cable before you install fixed drives. Do not block the airflow from the fans.

• You can install two simple-swap SATA hard disk drives in the server.

Note: You can install a third and fourth SATA drive if you install an optional ServeRAID 7t S-ATA controller in the server. The optional ServeRAID 7t S-ATA controller comes with two cables that you can use to cable the third and fourth SATA drives. In addition, if you install the optional ServeRAID 7t S-ATA controller to add a third and fourth drive, all four SATA drives must then be connected to the ServeRAID 7t S-ATA controller instead of the system board. See the optional ServeRAID 7t S-ATA controller documentation for cabling instructions.

- Install simple-swap SATA hard disk drives in this sequence: bay 7, bay 6, bay 5, and bay 4.
- Bays 5, 6, and 7 are simple-swap bays and do not require cabling. Bay 4 is a non-hot-swap drive bay and requires cabling as you would normally cable a non-hot-swap drive. See "Installing a drive in bay 2 or 4" on page 32 for information about how to install a hard disk drive in bay 4.

Complete the following steps to install a simple-swap hard disk drive:

1. Read "Installation guidelines" on page 23 and the safety information beginning at "Safety information" on page 107.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables.
3. Make sure that the side cover is unlocked in order to allow the door hatch to open. You do not have to remove the side cover.
4. Grasp the recessed area on the door hatch and rotate the door hatch outward until it disengages from the server.
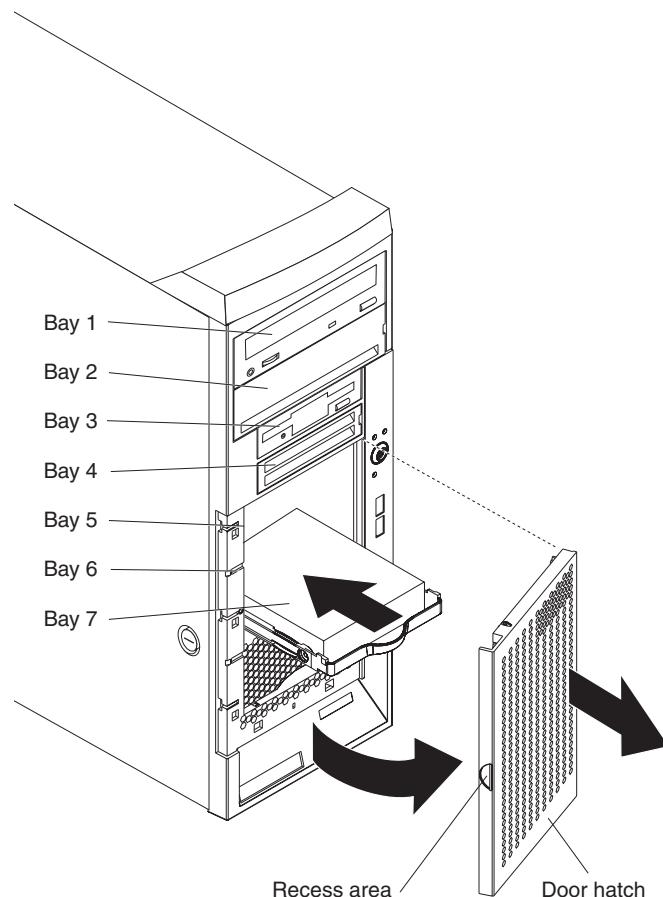
5. Touch the static-protective package containing the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.

6. Align the drive assembly with the guide rails in the bay.

7. Gently slide the drive assembly into the drive bay until the drive attaches to the back plate connector at the back of the drive bay and the tray clicks into place.

   Note: If you install a drive in bay 4, you will have to cable it as you would normally cable a non-hot-swap hard disk drive.

8. If you have other options to install or remove, do so now. Otherwise, close the hatch and lock the side cover; then, go to "Connecting the cables" on page 50 and "Updating the server configuration" on page 51.

Power and signal cables for internal drives

The server uses cables to connect parallel IDE, simple-swap Serial ATA, and SCSI devices to the power supply and to the system board (see "System-board internal connectors" on page 70 for the location of system-board connectors). Review the following information before connecting power and signal cables to internal drives:

- The drives that are preinstalled in the server come with power and signal cables attached. If you replace any drives, remember which cable is attached to which drive.
- When you install a drive, make sure that one of the signal cable drive connectors is connected to the drive and that the connector at the other end of the signal cable is connected to the system board.
- If you have only one IDE device on a cable, it must be set as a master device.
- If two IDE devices are used on a single cable, one must be designated as the master device and the other as the subordinate device; otherwise, the server might not recognize some of the IDE devices. The master and subordinate designation is determined by switch or jumper settings on each IDE device.

The following cables are provided:

- **Power cables:** Four-wire power cables connect the drives to the power supply. At the end of these cables are plastic connectors that can be attached to different drives; these connectors vary in size. Use either a four-wire power cable or Serial ATA power cable with Serial ATA drives, but do not use both at the same time (use one or the other).
- **Signal cables:** Signal cables are typically flat cables, also called ribbon cables, that connect parallel IDE, Serial ATA, SCSI, and diskette drives to the system board. Two or three types of signal cable come with the server:
  - **IDE:** The wider IDE signal cable has three connectors. One of these connectors is attached to the drive, one is a spare, and the third is attached to the primary or secondary IDE connector on the system board. The spare connector can be used to connect an additional IDE drive to the server.

    The CD-ROM drive is attached to an ATA 100 signal cable. ATA 100 signal cables are color-coded. The blue connector is attached to the system board. The black connector is attached to the master IDE device. The gray middle connector is attached to the subordinate IDE device.
  - **Diskette drive:** The narrower signal cable has two connectors. One is attached to the diskette drive, and the other is attached to the connector (FDD1) on the system board.
  - **Serial ATA (SATA):** The narrower, black signal cable has two connectors. One is connected to the Serial ATA drive, and the other is connected to the

connector on the system board. Each Serial ATA drive comes with a cable. If you install an additional Serial ATA drive, you will need an additional cable.

If you install the optional ServeRAID 7t S-ATA controller to add a third and fourth SATA drive, all four SATA drives must then be connected to the ServeRAID 7t S-ATA controller instead of the system board. The optional ServeRAID 7t S-ATA controller comes with two cables that you can use to cable the third and fourth SATA drives.

– **SCSI:** A round SCSI cable connects SCSI devices to the integrated SCSI controller with RAID capabilities on the system board.

- A round SCSI cable connects external SCSI devices to the integrated SCSI controller with RAID capabilities on the system board. For more information about connecting SCSI devices, see the SCSI documentation.

- An Ultra320 twisted ribbon cable connects the internal Ultra320 SCSI hard disk drive to the SCSI connector on the system board. This cable has four additional connectors for attaching more internal SCSI devices. For hot-swap models, the maximum cable length that supports Ultra320 SCSI hard disk drives is 40 cm (16 in.).

Installing an adapter

The following notes describe the types of adapters that the server supports and other information that you must consider when installing an adapter.

• Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section. If you need to change the switch settings or jumper settings on the adapter, follow the instructions that come with the adapter.

• Read the documentation that comes with the operating system.

• The server comes with five PCI slots.

• The standard SCSI adapter is installed in the mini-PCI-X slot.

• You can install full-length adapters in all five PCI slots.

• You can install only 32-bit adapters in the 32-bit PCI slots 3 through 5 and 64-bit adapters in the 64-bit PCI-X slots 1 and 2.

   Note: An illustration showing the numbering of the PCI slots can be found at "System-board option connectors" on page 69.

• The 32-bit PCI slots 3 through 5 support 5.0 V signaling PCI adapters; they do not support 3.3 V signaling adapters. However, 64-bit adapters are supported if they are universal adapters.

• The 64-bit PCI-X slots 1 and 2 support 3.3 V signaling PCI or PCI-X adapters; they do not support 5.0 V signaling adapters.

• The PCI bus configuration is as follows:

   – The 32-bit PCI slots 3 through 5 and the onboard ATI 7000M video adapter are on the 33 MHz PCI bus.

   – The 64-bit PCI-X slots 1 and 2 and the mini-PCI-X slot are on the 66 MHz PCI-X bus.

• The optional IBM Remote Supervisor Adapter II can be installed only in PCI-X slot 2. Use the ribbon cable that comes with this adapter to connect it to the Remote Supervisor Adapter II connector on the system board.

• If you install the optional IBM Remote Supervisor Adapter II, you must disconnect the video cable from the system board and connect it to the optional Remote Supervisor Adapter II.

- The optional ServeRAID-6i+ controller can be installed only in PCI-X slot 1.
- The server scans the PCI-X slot 2, PCI-X slot 1, mini-PCI-X slot, and PCI slots 5, 4, and 3 to assign system resources. Then, the server starts the PCI devices in the following order, if you have not changed the default startup sequence: PCI-X slot 2, PCI-X slot 1, mini-PCI-X slot, system-board integrated drive electronics (IDE) or SCSI devices (including the optional ServeRAID-6i+ controller), and then PCI slots 5, 4, and 3.
- For a list of supported options for the server, go to http://www.ibm.com/pc/support/.

See "System-board option connectors" on page 69 for the locations of expansion slots on the system board.

Complete the following steps to install an adapter:

1. Read "Installation guidelines" on page 23 and the safety information beginning at "Safety information" on page 107.
2. Turn off the server and peripheral devices and disconnect all power cords and external cables; then, remove the side cover. See "Removing the side cover" on page 26.
3. Follow the cabling instructions, if any, that come with the adapter. Route the adapter cables before you install the adapter.
4. Follow the instructions that come with the adapter to set jumpers or switches, if any.
5. Remove the frame-support bracket (see "Removing and installing the support bracket" on page 28).
6. Rotate the rear adapter-retention bracket to the open (unlocked) position and remove it from the server. Rotate the front adapter-retention bracket to the open position. If you are installing a smaller adapter, remove only the rear adapter-retention bracket.
7. Remove the expansion-slot cover. From the rear of the server, press on the slot cover. Grasp it and pull it out of the expansion slot. Store it in a safe place for future use.

   Note: Expansion-slot covers must be installed on all vacant slots. This maintains the electronic emissions standards of the server and ensures proper ventilation of server components.
8. Touch the static-protective package containing the adapter to any unpainted metal surface on the server. Then, remove the adapter from the static-protective package. Avoid touching the components and gold-edge connectors on the adapter.
9. Carefully grasp the adapter by the top edge or upper corners, and align it with the expansion-slot guides; then, press the adapter *firmly* into the expansion slot. Move the adapter directly from the static-protective package to the expansion slot.

   Attention: Make sure that the adapter is correctly seated in the expansion slot before you turn on the server. Incomplete installation of an adapter might damage the system board or the adapter.

Expansion-slot cover

Rear adapter-retaining bracket

Adapter

Front adapter-support bracket
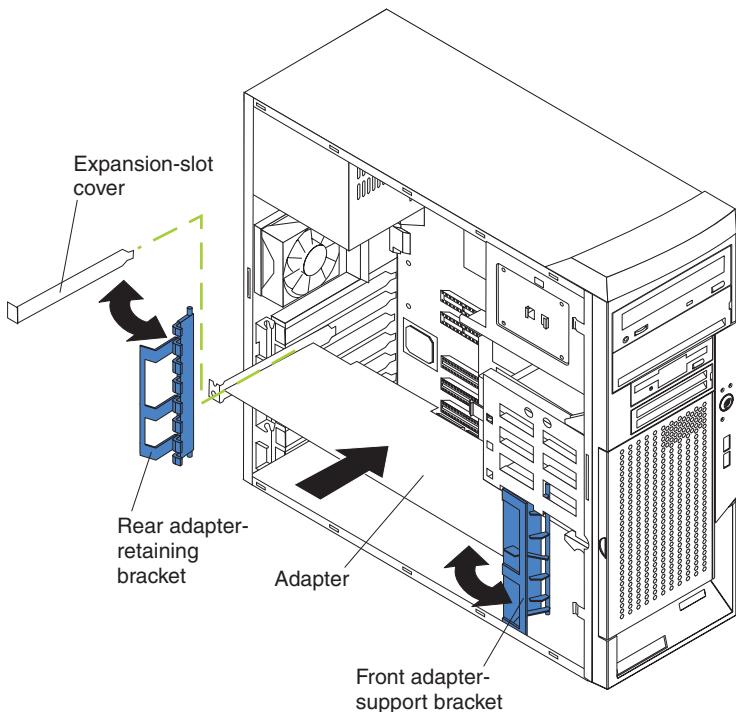
10. Connect required cables to the adapter. Route cables so that they do not block the flow of air from the fans. If you are installing an optional SCSI adapter, see "Cabling an optional SCSI adapter" for additional information.

11. If you have other options to install or remove, do so now.

12. If you have installed a full-length adapter, rotate the front adapter-support bracket to the closed (locked) position.

13. Reinstall the rear adapter-retention bracket; then, rotate the bracket to the closed (locked) position.

   Note: If any adapters in the server are large or have heavy cables attached to them, you can remove the rear adapter-retention bracket and secure all of the adapters with expansion-slot screws. The expansion-slot screws are stored on the frame-support bracket.

14. Replace the frame-support bracket (see "Removing and installing the support bracket" on page 28); then, go to "Completing the installation" on page 50.

Cabling an optional SCSI adapter

You can install an optional SCSI adapter in the server to control the internal hard disk drives. With a SCSI adapter installed, you can configure the internal hard disk drives into disk arrays. You can also cable a SCSI adapter to external hard disk drives. See the SCSI adapter option documentation for complete instructions for installing a SCSI adapter in the server and for additional information about SCSI adapters.

Note: An optional SCSI adapter or cable option is required to connect external SCSI devices.

Complete the following steps to cable an optional SCSI adapter:

1. Install the SCSI adapter (see "Installing an adapter" on page 44).

2. Connect the SCSI signal cable to the adapter and to one or more of the signal-cable connectors to the rear of the SCSI devices.

3. Connect the SCSI-activity-indicator cable to the adapter and to the SCSI LED connector on the system board (see "System-board internal connectors" on page 70).

SCSI cable

RAID adapter

SCSI connector
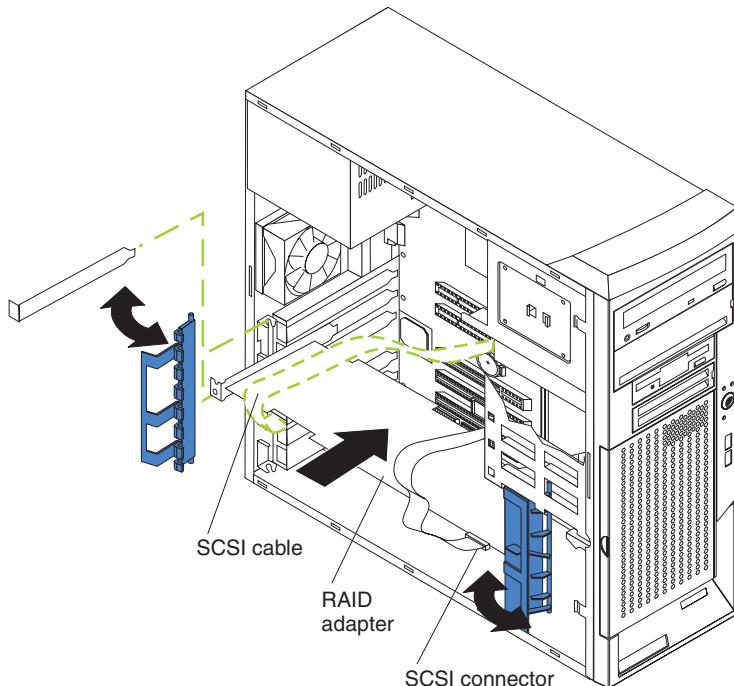
4. Complete the installation of the optional SCSI adapter.

Installing a security rope clip

To help prevent hardware theft, you can add a security rope clip and cable to the server. After you add the security cable, make sure that it does not interfere with other cables that are connected to the server.

Before you begin, obtain the following items:

- A flat-blade screwdriver
- An adjustable wrench
- A 19 mm (0.75 in.) rope clip or wire rope (similar to National Manufacturing number 3230, stock number 176-735)
- Threaded nuts that fit the rope clip
- A security cable
- A lock, such as a combination lock or padlock

Complete the following steps to install a rope clip:

1. Turn off the server and all attached devices. Disconnect all power cords and external cables; then, remove the side cover (see "Removing the side cover" on page 26).

2. Use a screwdriver to remove the two metal knockouts.

3. Insert the rope clip through the rear panel; then, attach and tighten the nuts.

4. Thread the cable through the rope clip and around an object that is not part of or permanently secured to the building structure or foundation, and from which

the cable cannot be removed. Fasten the cable ends together with a lock. After
you add the security cable, make sure that it does not interfere with other
cables that are connected to the server.

Rope clip
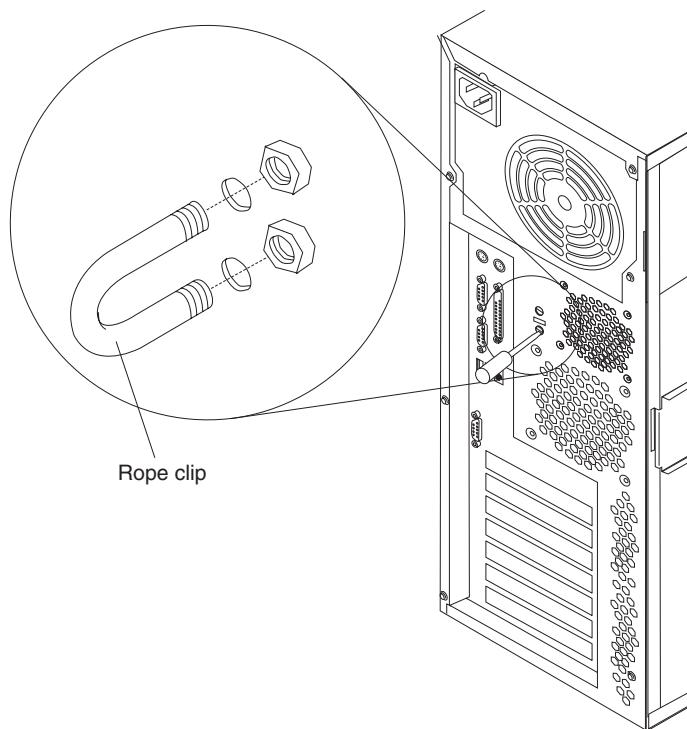
5. If you have other options to install or remove, do so now; otherwise, go to
   "Completing the installation" on page 50.

Replacing the battery

IBM has designed this product with your safety in mind. The lithium battery must be
handled correctly to avoid possible danger. If you replace the battery, you must
adhere to the following instructions.

Note: In the U.S., call 1-800-IBM-4333 for information about battery disposal.

If you replace the original lithium battery with a heavy-metal battery or a battery with
heavy-metal components, be aware of the following environmental consideration.
Batteries and accumulators that contain heavy metals must not be disposed of with
normal domestic waste. They will be taken back free of charge by the manufacturer,
distributor, or representative, to be recycled or disposed of in a proper manner.

To order replacement batteries, call 1-800-426-7378 within the United States, and
1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada,
call your IBM reseller or IBM marketing representative.

Note: After you replace the battery, you must reconfigure the server and reset the
system date and time.

Statement 2

CAUTION:
When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:
- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

Dispose of the battery as required by local ordinances or regulations.

Complete the following steps to replace the battery:

1. Read "Installation guidelines" on page 23 and the safety information beginning at "Safety information" on page 107.
2. Follow any special handling and installation instructions supplied with the replacement battery.
3. Turn off the server and all attached devices.
4. Disconnect all power cords; then, disconnect all external cables.
5. Remove the side cover and frame-support bracket (see "Removing the side cover" on page 26 and "Removing and installing the support bracket" on page 28).
6. Remove any adapters that impede access to the battery.
7. Remove the battery:

    a. Use a fingernail to press the top of the battery clip away from the battery. The battery pops up when released.

    b. Use your thumb and index finger to lift the battery from the socket.
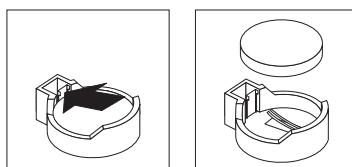
8. Insert the new battery:

    a. Tilt the battery so that you can insert it into the socket on the side opposite the battery clip.

    b. Press the battery down into the socket until it clicks into place. Make sure the battery clip holds the battery securely.
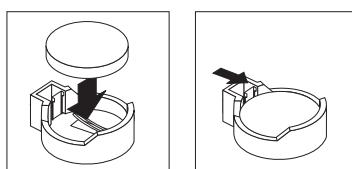
9. Replace the frame-support bracket and side cover (see "Removing and installing the support bracket" on page 28 and "Replacing the side cover").
10. Connect all external cables; then, connect the power cords.
11. Turn on the server.
12. Start the Configuration/Setup Utility program and set configuration parameters as needed. See the *User's Guide* on the IBM *xSeries Documentation* CD.

Completing the installation

To complete the installation, you must reinstall the bezel, reinstall the side cover, connect all the cables and, for certain options, run the Configuration/Setup Utility program. Follow the instructions in this section.

Replacing the bezel

Complete the following steps to replace the bezel:
1. Insert the two tabs on the bottom of the bezel into the matching holes on the server chassis.
2. Push the top of the bezel toward the server until the two tabs at the top of the bezel snap into place.
3. Make sure that the side cover is unlocked; then, slide the drive-bay lock bar to the right. The lock bar locks when you lock the side cover key lock.

Replacing the side cover

If you removed the support bracket or bezel, reinstall it before you replace the side cover (see "Removing and installing the support bracket" on page 28 and "Replacing the bezel").

Note: The rear adapter retaining bracket rests against the server side cover. You might find it easier to lay the server on its side to replace the side cover.

Complete the following steps to replace the side cover:
1. Before installing the cover, check that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server.
2. Insert the tabs inside the cover into the slots on the server chassis.

   Note: The cover-release latch must be in the unlocked (opened) position before you install the side cover.
3. Close the cover-release latch to secure the side cover in place.

   Note: Make sure that each tab on the side cover is in its corresponding slot before closing the cover-release latch.
4. Lock the side cover.

Connecting the cables

If the server cables and connector panel have color-coded connections, match the color of the cable end with the color of the connector. For example, match a blue cable end with a blue panel connector, a red cable end with a red connector, and so on.

Attention: To prevent damage to equipment, connect the power cords last.

The following illustration shows the input/output (I/O) connectors on the server.

Power cord
Mouse
Keyboard
Parallel
Serial 1
Video
USB 1
USB 2

Ethernet

Serial 2
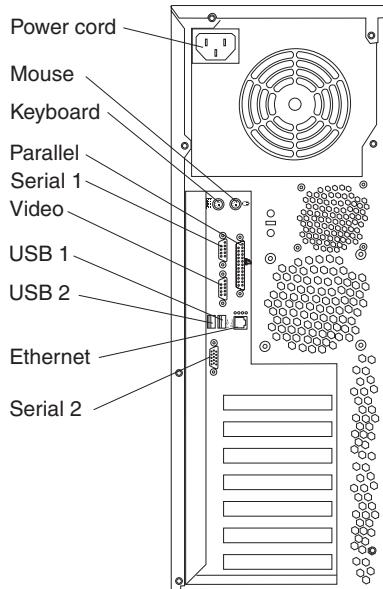
Updating the server configuration

When you start the server for the first time after you add or remove an internal option or an external SCSI device, you might receive a message that the configuration has changed. The Configuration/Setup Utility program starts automatically so that you can save the new configuration settings. See the *User's Guide* for additional information.

Some options have device drivers that you must install. See the documentation that comes with each option for information about installing device drivers.

If the server has a RAID configuration using the integrated SCSI controller with RAID capabilities or has a ServeRAID controller installed and you have installed or removed a hard disk drive, see the ServeRAID documentation that comes with the server for information about reconfiguring the disk arrays.

Connecting external options

If you install an optional SCSI adapter, you can attach external SCSI devices, such as a SCSI storage expansion enclosure, to the server.

Complete the following steps to attach an external device:

1. Review the safety information beginning at "Safety information" on page 107, "Installation guidelines" on page 23, and the documentation that comes with the option.
2. Turn off the server and all attached devices.
3. Follow the instructions that come with the option to prepare it for installation and to connect it to the server.

Note: If you are attaching an external SCSI device, see "Ultra320 SCSI connector" on page 55 for information about SCSI cabling and SCSI IDs.

Installing the server in a rack

An optional Tower-to-Rack Kit is needed to convert the server from a tower model to a rack model. You can then install the server in a rack cabinet. To order a Tower-to-Rack Kit for the server, contact your IBM marketing representative or authorized reseller.

Chapter 5. Input/output connectors

Connect optional external devices to the connectors on the front and rear of the server.

The server has the following input/output (I/O) connectors:
- One mouse connector
- One keyboard connector
- One parallel connectors
- Two serial connectors
- One video connector
- Two Ethernet connectors (RJ-45)
- One Ultra320 SCSI (some models)
- Two Universal Serial Bus (USB) V 2.0 connectors

The following illustration shows the locations of these connectors.
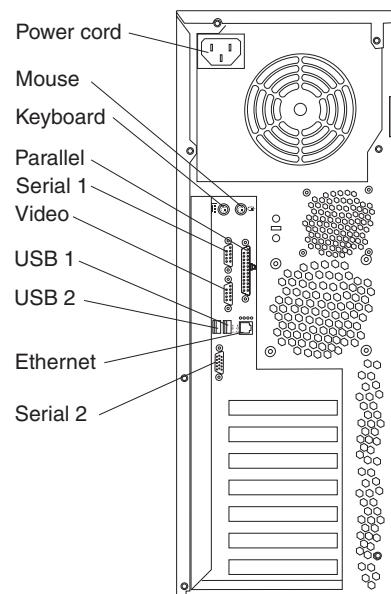
The following sections describe these connectors.

If you have an optional Remote Supervisor Adapter II (system-management adapter) installed in PCI-X slot 2, the server also has an additional Ethernet connector, an additional serial connector, and an Advanced System Management (ASM) Interconnect connector. See the documentation that comes with the Remote Supervisor Adapter II for more information about the ASM Interconnect network.

Auxiliary-device (pointing-device) connector

Use this connector to connect a mouse or other pointing device. The following illustration shows an auxiliary-device connector.
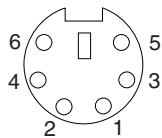
Ethernet (RJ-45) connector

The following illustration shows an Ethernet connector.
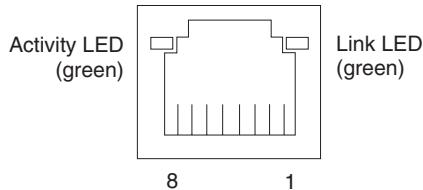
Connect a Category 3, 4, or 5 unshielded twisted-pair (UTP) cable to this connector. The 100BASE-TX and 1000BASE-T Fast Ethernet standards require Category 5 or higher cabling.

For more information about the Ethernet controller, see the *User's Guide*.

Keyboard connector

Use this connector to connect a PS/2 (non-USB) keyboard to the server. The following illustration shows a keyboard connector.
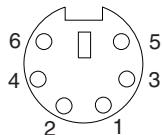
If you attach a keyboard to this connector, USB ports and devices are disabled during the power-on self-test (POST).

Parallel connector

Use this connector to connect a parallel device. The following illustration shows a parallel connector.
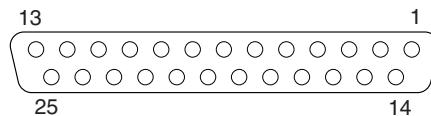
The parallel connector supports three standard Institute of Electrical and Electronics Engineers (IEEE) 1284 modes of operation: Standard Parallel Port (SPP), Enhanced Parallel Port (EPP), and Extended Capability Port (ECP). If you configure the parallel port to operate in bidirectional mode, it supports the ECP and EPP modes of operation. To configure the parallel port, use the **Devices and I/O Ports** option in the Configuration/Setup Utility program. See the *User's Guide* for more information. If you configure the parallel port to operate in bidirectional mode, use an IEEE 1284-compliant cable that does not exceed 3 meters (9.8 ft).

Serial connectors

Use the serial connectors to connect serial devices. The following illustration shows a serial connector.

```
    1          5
  ○ ○ ○ ○ ○
   ○ ○ ○ ○
    6       9
```
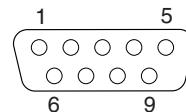
Ultra320 SCSI connector

You can install up to four internal SCSI devices using the SCSI cable that comes with some models of the server. Other server models might come with one SCSI cable that is connected from the internal SCSI connector to the standard hot-swap-drive backplane. You can attach additional internal SCSI devices to the other internal SCSI connector, or you can use the connector to attach external SCSI devices. To connect external SCSI devices, remove the SCSI knockout from the rear of the server and secure the free end of an optional cable in the new opening.

If you want to attach external SCSI devices to the server without using the internal SCSI channel, you must install an optional SCSI adapter.

Notes:

1. External SCSI devices connected to internal SCSI channels will operate asynchronously.
2. If you install a PCI RAID adapter to configure and manage the internal hot-swap drives, you must move the SCSI cable from the system-board SCSI connector to an internal channel connector on the RAID adapter (see "Cabling an optional SCSI adapter" on page 46).

An optional external SCSI connector might be installed on the rear of the server. Use this connector to connect external SCSI devices. The following illustration shows the SCSI standard 68-pin, female D-shell SCSI connector.

```
   34                                    1
   ▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭
   ▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭▭
   68                                    35
```
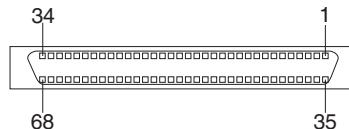
The server has an integrated SCSI controller with RAID capabilities that supports up to 15 SCSI devices. The SCSI connector for the control is on the system board. This controller uses:
- Double-transition clocking to achieve up to 320 MB-per-second data-transfer rates
- Domain name validation to negotiate compatible data-transfer speeds with each device
- Cyclic-redundancy checking (CRC), instead of the usual parity checking, to improve data reliability
- An active terminator for SCSI bus termination

Each SCSI device that is connected to a SCSI controller must have a unique SCSI ID. This ID enables the SCSI controller to identify the device and ensure that different devices on the same SCSI channel do not attempt to transfer data simultaneously. SCSI devices that are connected to different SCSI channels can have duplicate SCSI IDs.

The hot-swap-drive backplane controls the SCSI IDs for the internal hot-swap drive bays. However, when you attach an external SCSI device to an optional SCSI adapter, you must set a unique ID for the device. See the information that comes with the device for instructions on setting its SCSI ID.

You can install four internal SCSI devices using the SCSI signal cable that comes with some server models. If you plan to attach external SCSI devices, you must order an additional SCSI cable, remove the SCSI knockout from the rear of the server, and connect the new cable from the system board to this opening. To select and order the correct cables for use with external devices, contact your IBM reseller or IBM marketing representative. When using an optional SCSI adapter, you must also connect the SCSI adapter to the SCSI LED connector on the system board to receive an indication of SCSI hard-disk drive activity (see "System-board internal connectors" on page 70). For information about the maximum length of SCSI cable, see the American National Standards Institute (ANSI) SCSI standards on the ANSI Web site at http://www.ansi.org/. Adhering to these standards will help to ensure that the server operates correctly.

Universal Serial Bus connectors

Use a Universal Serial Bus (USB) 2.0 connector to connect a USB device. USB 2.0 technology transfers data at up to 480 Mb per second (Mbps) with a maximum of 127 devices and a maximum signal distance of 5 meters (16 ft) per segment (if the device that is attached to the server is a USB 2.0 device). If multiple USB devices are attached to the server, the USB hub must be 2.0; otherwise, all USB 2.0 devices will transfer data at 12 Mbps. Using Plug and Play technology, USB devices are configured automatically. The following illustration shows a USB connector.
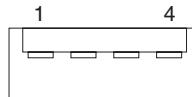
Use a 4-pin cable to connect a device to a USB connector. If you need to connect more USB devices than the server has USB connectors for, use a USB hub to connect additional devices.

If you connect a PS/2 (non-USB) keyboard to the keyboard connector, USB ports and devices are disabled during POST.

If you connect a USB keyboard that has a mouse port, the keyboard emulates a mouse, and you cannot disable the mouse settings in the Configuration/Setup Utility program.

Video connector

Use this video connector to connect a monitor to the server. The connector is dark blue to help you identify it. The following illustration shows an industry-standard 15-pin analog video connector on the rear of the server.
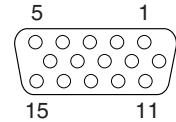
Chapter 6. Field replaceable units

This chapter describes the removal of server components.

Important: The field replaceable unit (FRU) procedures are intended for trained servicers who are familiar with IBM xSeries products. Customer replacement units (CRUs) can be replaced by the customer. See the parts listing in "System" on page 100 to determine if the component being replaced is a CRU or a FRU.

Hard disk drive backplane

Note:
- Read "Installation guidelines" on page 23.
- Read the safety notices at "Safety information" on page 107.
- Read "Handling static-sensitive devices" on page 24.

Complete the following steps to remove the hard disk drive backplane:

1. Turn off the server and attached devices; then, disconnect all power cords and external cables.
2. Remove the cover and support bracket (see"Removing the side cover" on page 26 and "Removing and installing the support bracket" on page 28).
3. Remove all hard disk drives (see "Installing a drive" on page 31).

   Important: Be sure to identify in which bay each drive belongs so that they are in the correct order when reinstalled.
4. Pivot the drive cage out until it locks in position.
5. Disconnect the three cables from the hard disk drive backplane.

   Note: The illustrations in this document might differ slightly from your hardware.
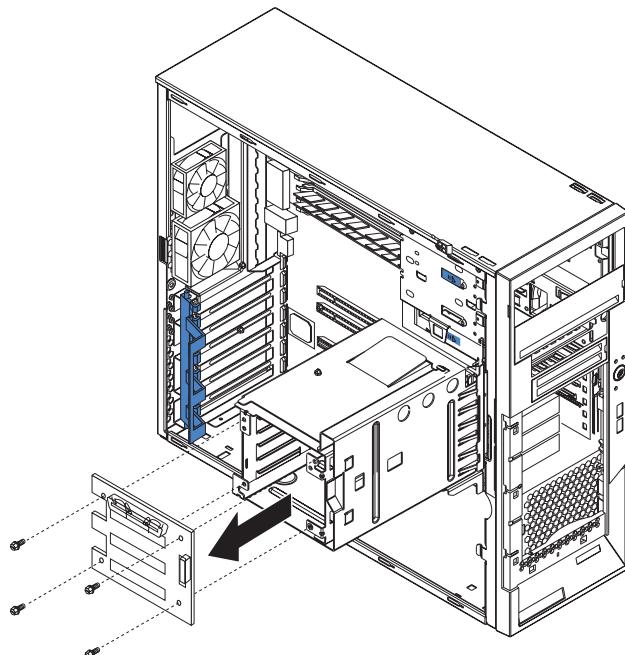
6. Remove the four screws that secure the hard disk drive backplane to the drive cage and set them in a safe place; then, lift the backplane out of the server.

To install the hard disk drive backplane, reverse the previous steps.

Note: The drive cage will lock in the pivoted position. To lower the drive cage, press in on the blue flap on the side of the drive cage.

SCSI mini-PCI-X adapter

Note:

- Read "Installation guidelines" on page 23.
- Read the safety notices at "Safety information" on page 107.
- Read "Handling static-sensitive devices" on page 24.

Complete the following steps to remove the SCSI mini-PCI-X adapter:

1. Turn off the server and attached devices; then, disconnect all power cords and external cables.

   Note: It may be easier to perform this procedure if the server is laying on its side.

2. Remove the cover and support bracket (see"Removing the side cover" on page 26 and "Removing and installing the support bracket" on page 28).

3. Remove any adapters (see "Installing an adapter" on page 44) that impede access to the SCSI mini-PCI-X adapter.

4. Disconnect the cable from the SCSI mini-PCI-X adapter.

   Note: The illustrations in this document might differ slightly from your hardware.
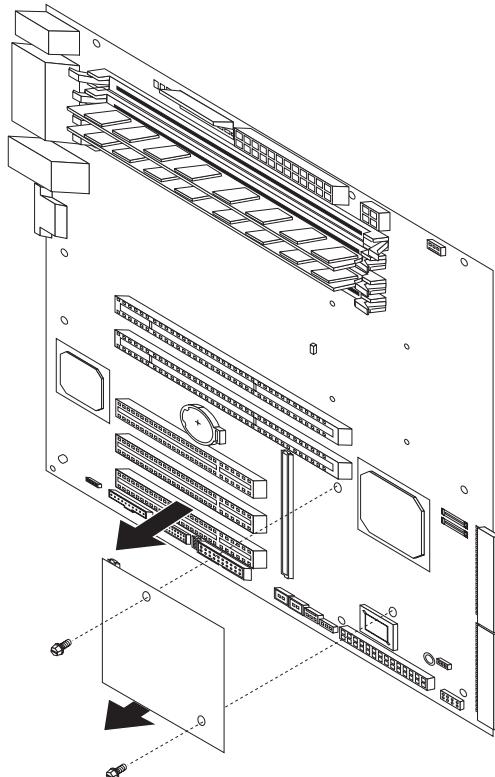
   Note: The plastic stand-offs are shown detached in the illustration above.

5. Using pliers, gently pinch the top of each of the two plastic stand-offs that secure the adapter to the system board; then, place a finger under the adapter near each stand-off and pull up until the adapter disengages from the stand-off.

> **Note:** If the stand-offs come away from the system board with the SCSI mini-PCI-X adapter, remove them from the adapter as described above and push them back into their apertures on the system board, making sure that they snap firmly into place

6. Place two fingers under the corners of the adapter nearest to the rear of the server; then, gently lift up until the connector on the adapter disengages from its socket on the system board and remove it from the server.

To install the SCSI mini-PCI-X adapter, reverse the preceding steps, making sure that:

1. The plastic stand-offs are attached to the system board.
2. The holes in the SCSI mini-PCI-X adapter are aligned correctly with the stand-offs.
3. Only when the adapter is aligned correctly with the stand-offs should you push down on the connector to insert it firmly into the socket.
4. Make sure that the plastic stand-offs snap into place in the SCSI mini-PCI-X adapter.

Rear fan

> **Note:**
> - Read "Installation guidelines" on page 23.
> - Read the safety notices at "Safety information" on page 107.
> - Read "Handling static-sensitive devices" on page 24.

Complete the following steps to remove a rear fan:

1. Turn off the server and attached devices; then, disconnect all power cords and external cables.
2. Remove the cover and support bracket (see"Removing the side cover" on page 26 and "Removing and installing the support bracket" on page 28).

    > **Note:** It may be easier to access the fan if the adapters are removed (see "Installing an adapter" on page 44).

3. Disconnect the fan cable from the system board, making a note of where the cable was connected for later installation.

    > **Note:** The illustrations in this document might differ slightly from your hardware.
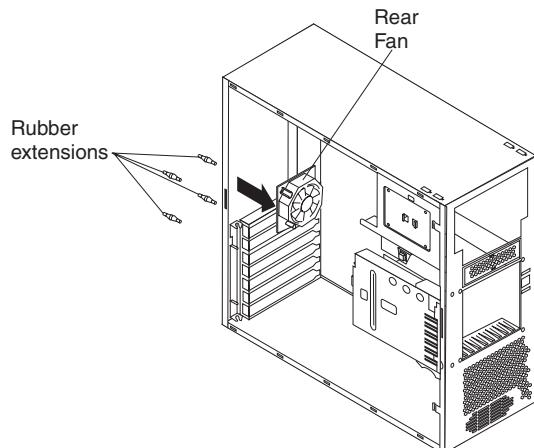
4. Grasp the fan with both hands and pull firmly, extending the rubber grommets; the grommets will be pulled through the holes in either the fan or the chassis and can then be removed.

   Note: It may be easier to use side cutters to sever the grommets.
5. Pull the fan up and out of the chassis.

To install the rear fan, reverse the previous steps, attaching the rubber grommets to the fan and then using needle-nosed pliers to pull them through the holes in the chassis.

Control panel assembly

Note:
  - Read "Installation guidelines" on page 23.
  - Read the safety notices at "Safety information" on page 107.
 - Read "Handling static-sensitive devices" on page 24.

Complete the following steps to remove the control panel assembly:
1. Turn off the server and attached devices; then, disconnect all power cords and external cables.
2. Remove the cover and support bracket (see"Removing the side cover" on page 26 and "Removing and installing the support bracket" on page 28).
3. Remove the front bezel (see "Removing the bezel" on page 27).

   Note: This procedure will be easier to perform if the server is on its side.
4. Remove any hot-swap hard disk drives that are installed.

   Attention: Attempting to pivot the drive cage with hot-swap drives installed might damage the drives.
5. Pivot the drive cage out until it locks in position.

   Attention: Do not place any strain on the hard disk drive cables; it might be necessary to disconnect these cables before pivoting the drive cage.
6. Disconnect the control panel assembly cables from the system board.

Note: The illustrations in this document might differ slightly from your hardware.
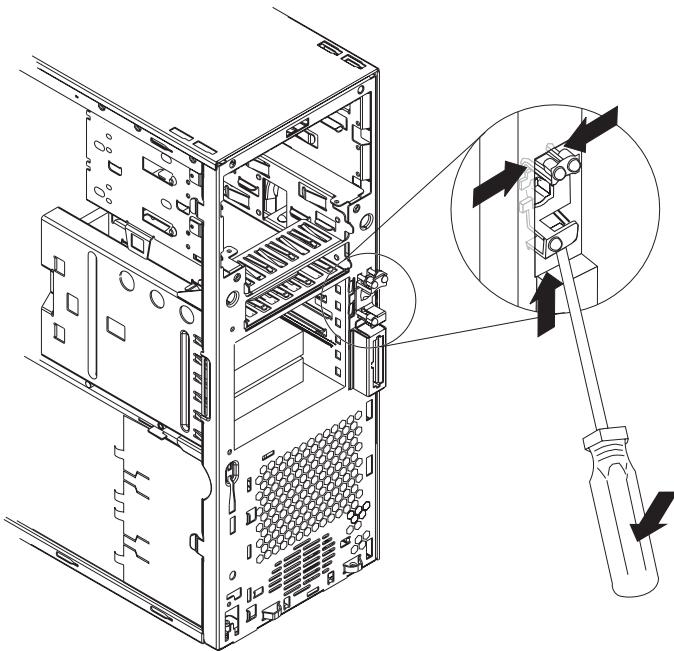
7. Use a flat-blade screwdriver to press up on the lower tab of the control panel assembly until the bottom of the assembly detaches from the chassis.

8. Press together the two latches at the top of the assembly until it detaches from the chassis; then, pull the control panel assembly out of the chassis through the front, making sure that the cables follow freely.

> **Important:** When removing the assembly, note the routing of the cables through the aperture in the chassis. You must route the cables through this aperture upon reinstallation to avoid damage to the cables when the drive cage is in the closed position.

To install the control panel assembly, reverse the previous steps, making sure to route the cables carefully and snap the operator information panel into place.

Front USB connector assembly

Note:
- Read "Installation guidelines" on page 23.
- Read the safety notices at "Safety information" on page 107.
- Read "Handling static-sensitive devices" on page 24.

Complete the following steps to remove the front USB connector assembly:

1. Turn off the server and attached devices; then, disconnect all power cords and external cables.

2. Remove the cover and support bracket (see"Removing the side cover" on page 26 and "Removing and installing the support bracket" on page 28).

3. Remove the front bezel (see "Removing the bezel" on page 27).

4. Rotate the drive cage up.

   Attention: Do not place any strain on the hard disk drive cables; it might be necessary to disconnect these cables before pivoting the drive cage.

5. Disconnect the front USB connector assembly cable from the system board.

Note: The illustrations in this document might differ slightly from your hardware.
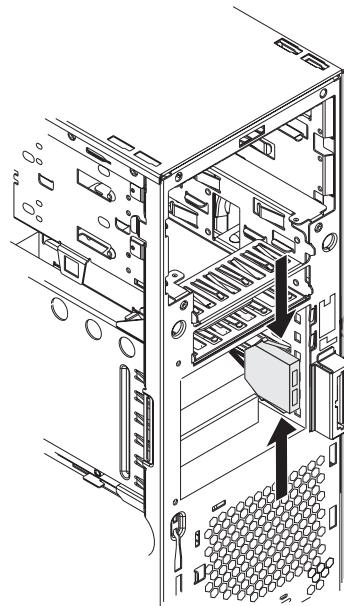
6. From the inside of the chassis, place your fingers on the two tabs on the front USB connector assembly and squeeze them together and detach the assembly from the server; then, pull the assembly toward the inside of the chassis and through the aperture at the drive cage to remove it.

To install the front USB connector assembly, reverse the previous steps, routing the cable correctly and snapping the front USB connector assembly into place.

Power supply

Note:
- Read "Installation guidelines" on page 23.
- Read the safety notices at "Safety information" on page 107.
- Read "Handling static-sensitive devices" on page 24.

Complete the following steps to remove the power supply:

1. Turn off the server and attached devices; then, disconnect all power cords and external cables.
2. Remove the cover and support bracket (see"Removing the side cover" on page 26 and "Removing and installing the support bracket" on page 28).
3. Disconnect the internal power supply cables.

Note: The illustrations in this document might differ slightly from your hardware.
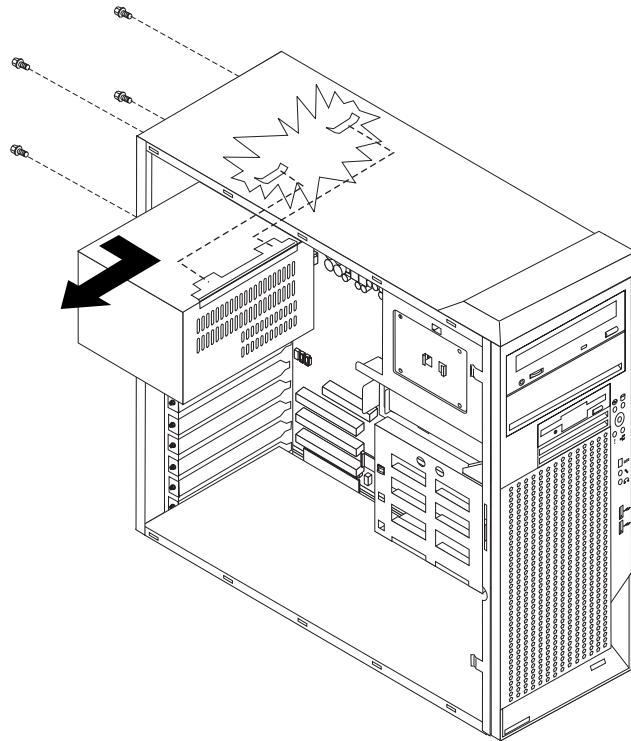
4. Remove the four screws that secure the power supply to the chassis.
5. Lift the power supply out of the chassis, disengaging it from the two connectors on the chassis.

Note: The illustrations in this document might differ slightly from your hardware.
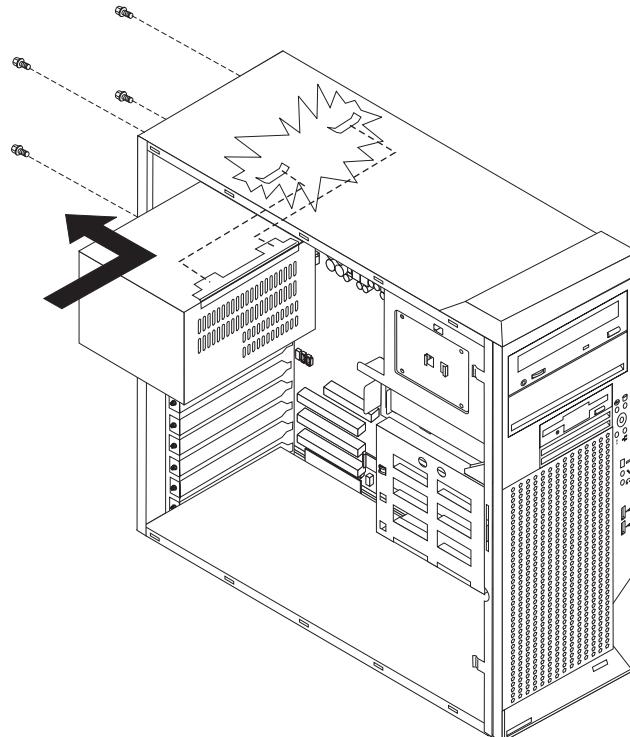
To replace the power supply, reverse the previous steps, making sure to engage the hooks on the power supply to the slots on the chassis.

## Microprocessor and fan sink

Note:
- Read "Installation guidelines" on page 23.
- Read the safety notices at "Safety information" on page 107.
- Read "Handling static-sensitive devices" on page 24.

Complete the following steps to remove the fan-sink assembly and the microprocessor:

1. Turn off the server and attached devices; then, disconnect all power cords and external cables.
2. Turn the server on its side so that it is laying flat, with the cover facing up.
3. Remove the cover and support bracket (see"Removing the side cover" on page 26 and "Removing and installing the support bracket" on page 28).
4. Disconnect the fan sink cable from the system board.
5. Disconnect any cables that impede access to the microprocessor.

   Note: The illustrations in this document might differ slightly from your hardware.

Orientation indicators
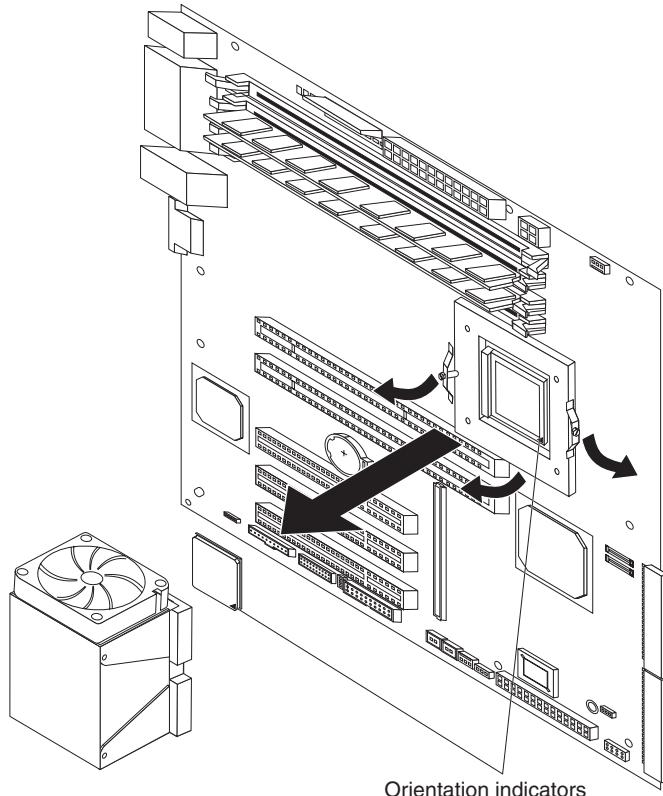
6. Loosen the two captive screws on either side (in leaf spring enclosures) of the heat sink.
7. With the two captive screws loosened, pivot the leaf-spring assemblies outward and out of the notches on the fan-sink assembly.

Attention: Before attempting to remove the heat sink from the microprocessor, note that the heat-conducting grease between the heat sink and the microprocessor might have formed a strong bond. Do not force the components apart; doing so can damage the microprocessor pins. Loosening one screw fully before loosening the other screw will help to break the thermal bond that adheres the heat sink to the microprocessor.

Important: Be careful when handling the adhesive material on the microprocessor. If the adhesive material on the microprocessor will be reused, do not contaminate it. If replacement adhesive material is provided with the replacement part, be sure to remove all traces of existing adhesive material from the microprocessor before applying the new adhesive material.

8. Lift the fan sink up and out of the server.

   Note: It might be necessary to gently twist the heat sink to loosen it from the microprocessor.

9. Rotate the locking lever on the microprocessor socket from its closed and locked position until it stops or clicks in the fully open position.

10. Pull the microprocessor out of the socket.

    Attention: You must make sure that the locking lever on the microprocessor socket is in the fully open position before you insert the microprocessor into the socket. Failure to do so might result in permanent damage to the microprocessor, microprocessor socket, and microprocessor board.

To install a microprocessor and heat sink, reverse the preceding steps.

Important: When installing a microprocessor make sure that the orientation indicator on the microprocessor is aligned with the orientation indicator on the microprocessor socket.

System board

This section shows the locations of items on the system board and describes how to remove the system board.

System-board option connectors

The following illustration shows the system-board connectors.
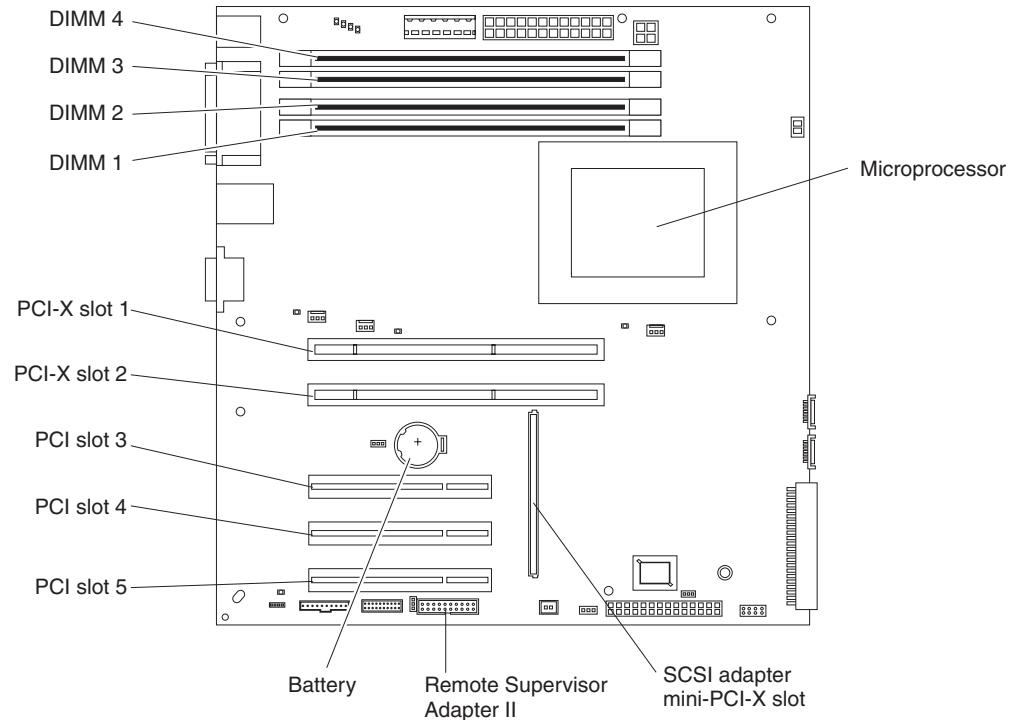
System-board internal connectors

The following illustration shows the internal connectors on the system board.
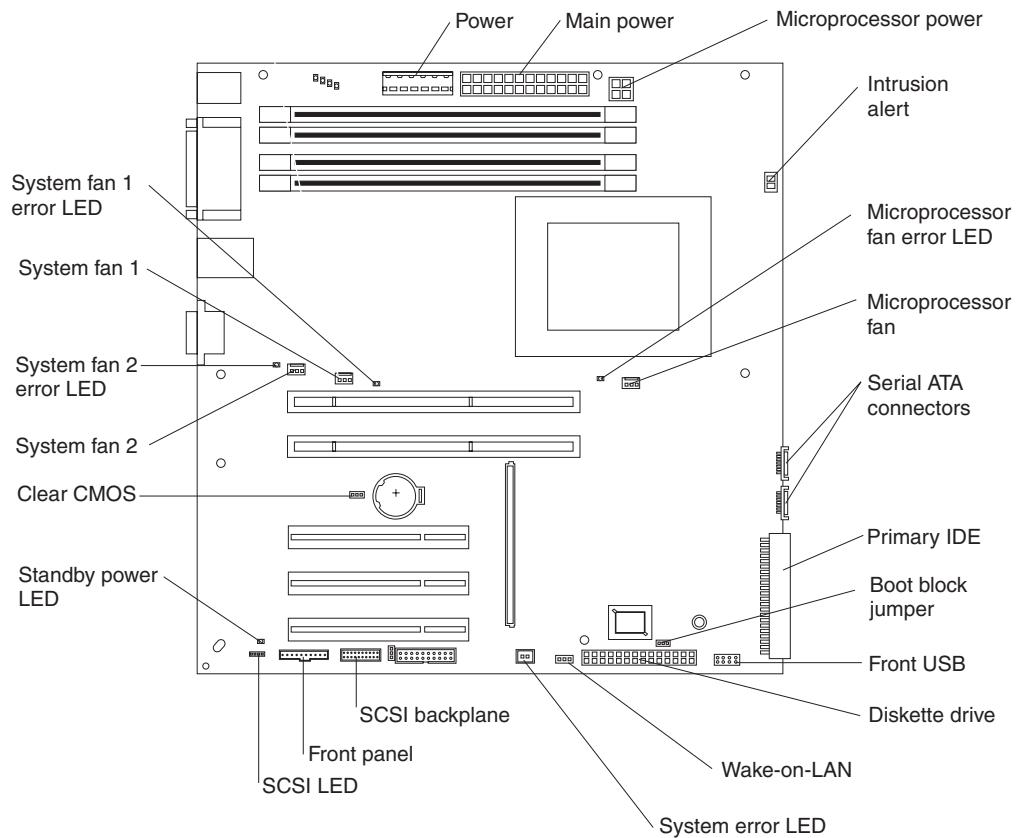
System-board external connectors

The following illustration shows the external input/output port connectors on the system board.

Mouse
Keyboard
Serial 1
Parallel
Video
USB 2
USB 1
Ethernet
Serial 2

Front USB
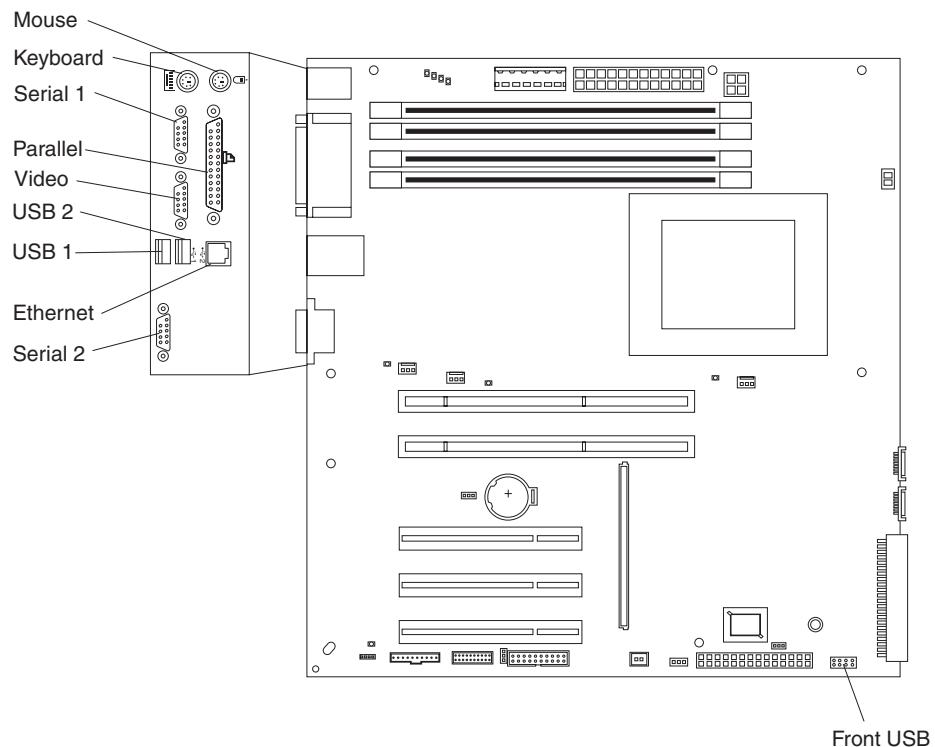
System-board LEDs

The following illustration shows the LEDs on the system board.

DIMM 3 error LED   DIMM 2 error LED

DIMM 4 error LED   DIMM 1 error LED

Microprocessor
fan error LED

System fan 2
error LED

System fan 1
error LED

Standby power
LED
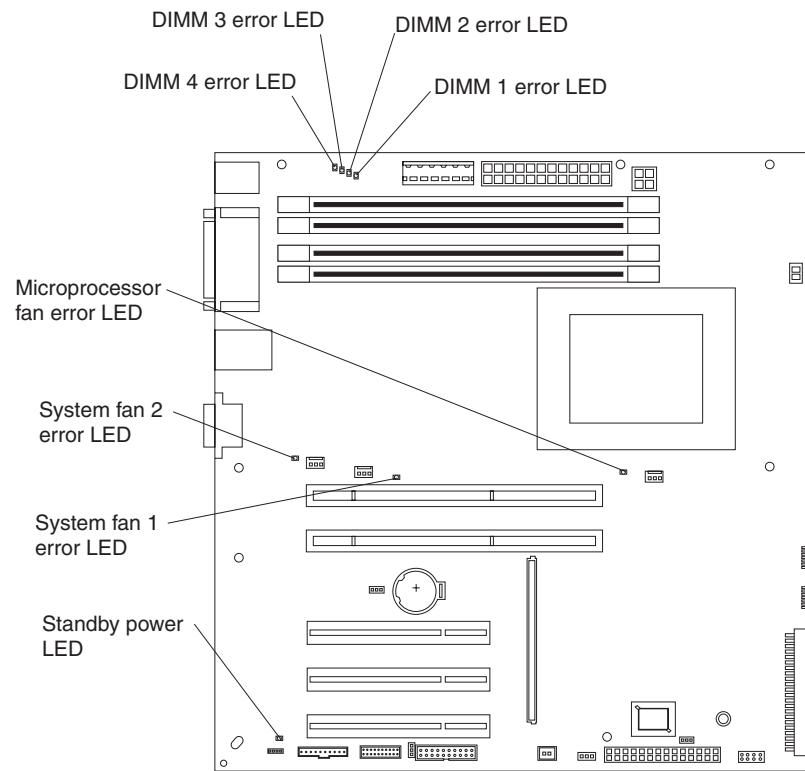
System-board switches and jumpers

The following illustration shows the location of the switches and jumper blocks on the system board.

CMOS jumper (JP2)

Boot block jumper (JP1)
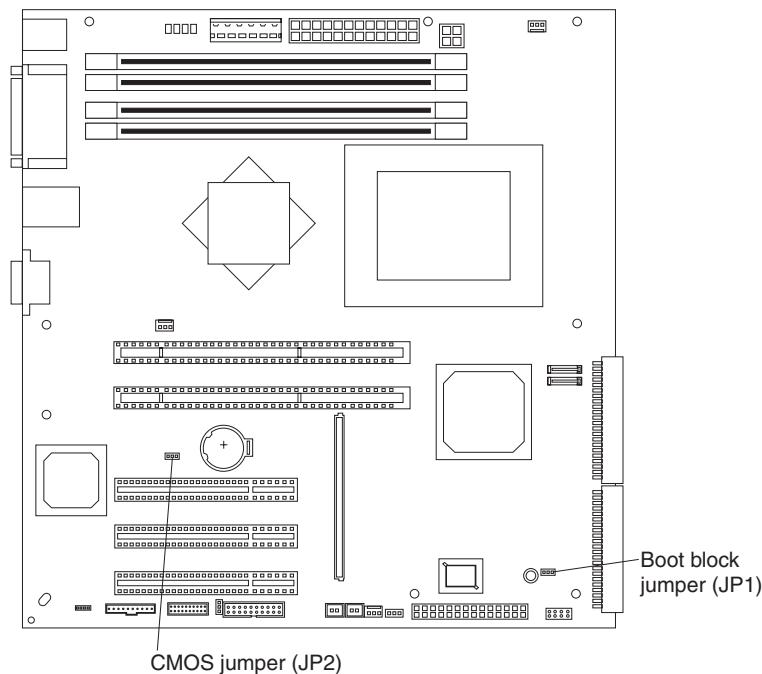
Any jumper blocks on the system board that are not shown in the illustration are reserved. For information about BIOS code recovery or the boot block recovery jumper, see "Recovering from a POST/BIOS update failure" on page 20.

System board removal

Notes:

1. Read "Installation guidelines" on page 23, "Handling static-sensitive devices" on page 24, and "Safety information" on page 107.
2. When replacing the system board, you must either update the system with the latest firmware or restore the pre-existing firmware that the customer provides on a diskette or CD image.

Complete the following steps to remove the system board:

1. Turn off the server and attached devices; then, disconnect all power cords and external cables.
2. Turn the server on its side so that it is laying flat, with the cover facing up.
3. Remove the cover and support bracket (see"Removing the side cover" on page 26 and "Removing and installing the support bracket" on page 28).
4. Disconnect all cables on the system board.

   Attention: Do not place any strain on the hard disk drive cables; if necessary, disconnect these cables from the hard disk drive backplane before pivoting the drive cage.
5. Pivot the drive cage up.

   Note: The drive cage will lock in the pivoted position. To lower the drive cage, press in on the blue flap on the side of the drive cage.

6. Remove any of the following components that are installed on the system board and put them in a safe, static-protective place:
   - Adapters (see "Installing an adapter" on page 44), including the SCSI mini-PCI-X adapter (see "SCSI mini-PCI-X adapter" on page 61).
   - Microprocessor and fan sink assembly (see "Microprocessor and fan sink" on page 67).

     Important: If you plan to reinstall an existing microprocessor to the new system board, be careful when handling the adhesive material on the microprocessor. If the adhesive material on the microprocessor will be reused, do not contaminate it. If replacement adhesive material is provided with the replacement system board, be sure to remove all traces of existing adhesive material from the microprocessor before applying the new adhesive material.
   - DIMMs (see "Installing a memory module" on page 29).

   Notes:
   a. The power supply has been removed in the illustration for clarity. If any installed items impede your ability to easily access the system board, remove them before proceeding.
   b. The illustrations in this document might differ slightly from your hardware.

System board mounting screws (10 places)
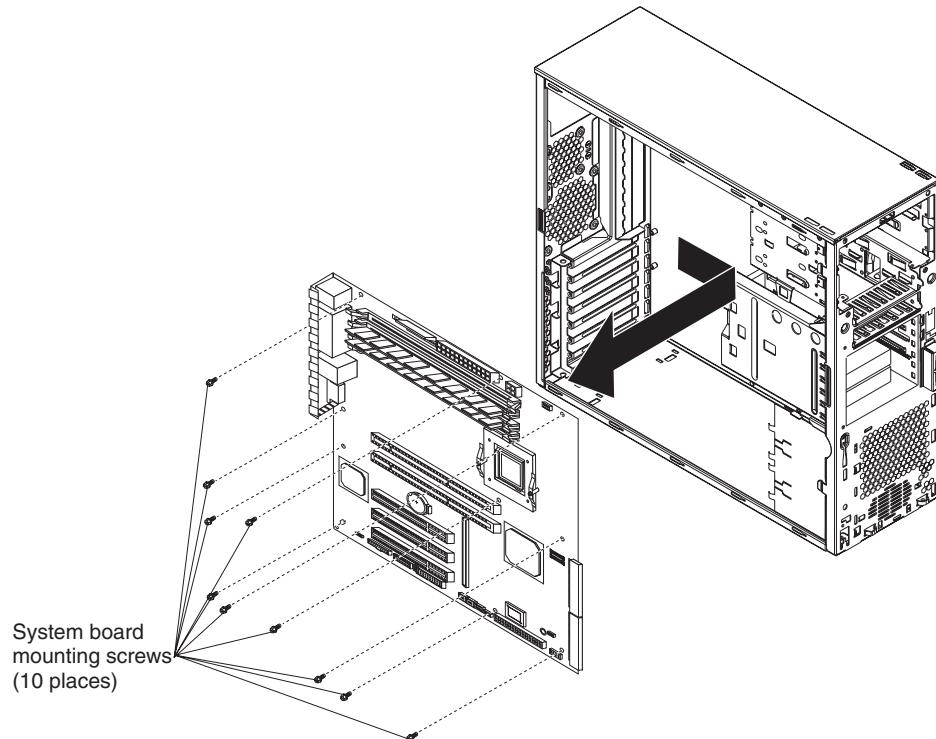
7. Remove the 10 screws that secure the system board to the chassis and put them in a safe place.

   Note: Do not remove the screws securing the heat sink retention module at this time. The heat sink retention module remains on the system board when the system board is removed.

8. Gently slide the system board toward the front of the server to disengage the retention tab on the bottom of the system board from the notch on the chassis; then, lift it up and out of the server.
9. If you are installing a new system board, remove the heat sink retention module and the retention tab on the bottom of the system board and install them on the new system board.

To reinstall the board, place it into position in the server and slide it toward the rear of the server until the holes on the system board are aligned with the holes in the chassis; then, replace the components that were removed in step 6 on page 74.

Important: When installing the system board, make sure that the clips at the I/O section of the system board slide into position on the chassis.

When reassembling the components in the server, be sure to route all cables carefully so that they are not exposed to excessive pressure.

Chapter 7. Symptom-to-FRU index

The symptom-to-FRU index lists symptoms, errors, and the possible causes. The most likely cause is listed first. Use this symptom-to-FRU index to help you decide which FRUs to have available when servicing the server.

Notes:

1. The field replaceable unit (FRU) procedures in this manual are intended for trained servicers who are familiar with IBM xSeries products. Customer replacement units (CRUs) can be replaced by the customer. See the parts listing in "System" on page 100 to determine if the component being replaced is a CRU or a FRU.

2. Check the configuration before you replace a FRU. Configuration problems can cause false errors and symptoms.

3. For IBM devices not supported by this index, refer to the manual for that device.

4. Always start with "General checkout" on page 13.

5. Some tables have more than two columns; in those instances, more than one column on the left is required to describe the error symptom. Take the action (or replace the FRU) suggested first in the list of the right-hand column, then try the server again to see if the problem has been corrected before taking further action.

6. Always try reseating a suspected component or reconnecting a cable before replacing the component.

The left-hand column of the tables in this index lists error codes or messages, and the right-hand column lists one or more suggested actions or FRUs to replace.

The POST BIOS code displays POST error codes and messages on the screen.

Beep symptoms

Beep symptoms are short tones or a series of short tones separated by pauses (intervals without sound). See the examples in the following table.

Beeps	Description
1-2-3	• One beep • A pause (or break) • Two beeps • A pause (or break) • Three beeps
4	Four continuous beeps

One beep after successfully completing POST indicates that the server is functioning correctly.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).

Beep/symptom	FRU/action
1-1-3 (CMOS write/read test failed)	1. **Battery** 2. System board
1-1-4 (BIOS EEPROM checksum failed)	• **System board**
1-2-1 (Programmable Interval Timer failed)	• **System board**
1-2-2 (DMA initialization failed)	• **System board**
1-2-3 (DMA page register write/read failed)	• **System board**
1-3-1 (first 64K RAM test failed)	1. **DIMM** 2. System board
1-3-2 (first 64K RAM parity test failed)	1. **DIMM** 2. System board
2-1-1 (Secondary DMA register failed)	• **System board**
2-1-2 (Primary DMA register failed)	• **System board**
2-1-3 (Primary interrupt mask register failed)	• **System board**
2-1-4 (Secondary interrupt mask register failed)	• **System board**
2-2-2 (Keyboard controller failed)	1. **Keyboard** 2. System board
2-2-3 (CMOS power failure and checksum checks failed)	1. **Battery** 2. System board

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
Beep/symptom	**FRU/action**
2-4-1 (Video failed; system believed operable)	• **System board**
3-1-1 (Timer tick interrupt failed)	• **System board**
3-1-2 (Interval timer channel 2 failed)	• **System board**
3-1-3 (RAM test failed above address OFFFFH))	1. **DIMM** 2. System board
3-1-4 (Time-of-Day clock failed)	1. **Battery** 2. System board
3-2-1 (Serial port failed)	• **System board**
3-2-2 (Parallel port failed)	• **System board**
3-2-4 (Failure comparing CMOS memory size against actual)	1. **DIMM** 2. Battery 3. System board
3-3-1 (Memory size mismatch occurred.)	1. **DIMM** 2. Battery 3. System board
3-3-2 (I2C bus error occurred)	• **Disconnect server power, wait 30 seconds, and retry.** • System board
3-3-3 (No memory installed)	1. **Install or reseat the memory modules.** 2. DIMMs. 3. System board.

No-beep symptoms

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
No-beep symptom	**FRU/action**
No beep during POST.	• **System board**

POST error codes

In the following error codes, x can be any number or letter.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	

Error code/symptom	FRU/action
062 (Three consecutive startup failures using the default configuration.)	1. **Run the Configuration/Setup Utility program.** 2. Battery. 3. System board. 4. Microprocessor.
101, 102 (System and processor error)	• **System board**
106 (System and processor error)	• **System board**
114 (Adapter read-only memory error (check 55 AA))	1. **Run diagnostics.** 2. Adapter.
151 (Real time clock error)	1. **Battery** 2. System board
161 (Real time clock battery error)	1. **Run the Configuration/Setup Utility program.** 2. Battery. 3. System board.
162 (Device configuration error) **Note:** Be sure to load the default settings and any additional desired settings; then, save the configuration.	1. **Run the Configuration/Setup Utility program.** 2. Battery. 3. Failing device. 4. System board.
163 (Real-time clock error)	1. **Run the Configuration/Setup Utility program.** 2. Battery. 3. System board.
164 (Memory configuration changed.)	1. **Run the Configuration/Setup Utility program.** 2. DIMM. 3. System board.
176 (Computer cover or cable cover removed without use of key)	• **Run the Configuration/Setup Utility program.**
184 (Power-on password damaged)	1. **Run the Configuration/Setup Utility program.** 2. System board.
185 (Drive startup sequence information corrupted)	• **Run the Configuration/Setup Utility program.**
187 (VPD serial number not set.)	1. **Set serial number in the Configuration/Setup Utility program.** 2. System board.
188 (Bad EEPROM CRC #2)	1. **Run the Configuration/Setup Utility program.** 2. System board.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
Error code/symptom	**FRU/action**
189 (An attempt was made to access the server with invalid passwords)	• **Run the Configuration/Setup Utility program, and enter the administrator password.**
201 (Memory test error.) If the server does not have the latest level of BIOS installed, update the BIOS to the latest level and run the diagnostic program again.	1. **DIMM** 2. System board
289 (DIMM disabled by POST or user)	1. **Run the Configuration/Setup Utility program, if the DIMM was disabled by the user.** 2. Disabled DIMM, if not disabled by user. 3. System board
301 (Keyboard or keyboard controller error)	1. **Keyboard** 2. System board
303 (Keyboard controller error)	• **System board**
602 (Invalid diskette boot record)	1. **Diskette** 2. Diskette drive 3. Cable 4. System board
604 (Diskette drive error)	1. **Run the Configuration/Setup Utility program.** 2. Diskette drive. 3. Cable. 4. System board.
662 (Diskette drive configuration error)	1. **Run the Configuration/Setup Utility program and diagnostics.** 2. Diskette drive. 3. Drive cable. 4. System board.
962 (Parallel port error)	1. **Disconnect the external cable on the parallel port.** 2. Run the Configuration/Setup Utility program. 3. System board.
1162 (Serial port configuration conflicts)	1. **Run the Configuration/Setup Utility program** and ensure that the IRQ and I/O port assignments needed by the serial port are available. 2. If all interrupts are being used by adapters, remove an adapter or force other adapters to share an interrupt.
1762 (Hard disk configuration error)	1. **Hard disk drive.** 2. Hard disk drive cables. 3. Run the Configuration/Setup Utility program. 4. SCSI backplane. 5. System board.
1800 (No more hardware interrupts available for PCI adapter)	1. **Run the Configuration/Setup Utility program.** 2. Remove adapter.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
Error code/symptom	**FRU/action**
1801 (No more ROM space available for PCI adapter)	1. **Run the Configuration/Setup Utility program.** 2. Remove adapter. 3. Disable adapter BIOS code and run the Configuration/Setup Utility program.
1962 (Drive does not contain a valid boot sector)	1. **Verify that a startable operating system is installed.** 2. Run diagnostics. 3. Hard disk drive. 4. SCSI backplane. 5. Cable. 6. System board.
5962 (IDE CD-ROM drive configuration error)	1. **Run the Configuration/Setup Utility program.** 2. CD-ROM drive. 3. CD-ROM power cable. 4. IDE cable. 5. System board. 6. Battery.
8603 (Pointing-device error)	1. **Pointing device** 2. System board
00012000 (Microprocessor machine check)	1. **Microprocessor** 2. System board
00019701 (Processor failed BIST)	1. **Microprocessor** 2. System board
00180200 (No more I/O space available for PCI adapter)	1. **Run the Configuration/Setup Utility program.** 2. Adapter. 3. System board.
00180300 (No more memory above 1MB for PCI adapter)	1. **Run the Configuration/Setup Utility program.** 2. Adapter. 3. System board.
00180500 (PCI option ROM checksum error)	1. **Adapter** 2. System board
00180600 (PCI device BIST failure)	1. **Run the Configuration/Setup Utility program.** 2. Adapter. 3. System board.
00180700 (PCI device not responding)	1. **System board** 2. Adapter
00181000 (General PCI error)	1. **Adapter** 2. System board
I9990650 (AC power has been restored)	1. **Check cable.** 2. Check for interruption of power. 3. Power cable.

Diagnostic error codes

> **Note:** In the following error codes, if XXX is *000, 195*, or *197, do not* replace a FRU. The description for these error codes are:
>
> **000** The test passed.
>
> **195** The Esc key was pressed to stop the test.
>
> **197** Warning; a hardware failure did not occur. The test could not be run due to some other problem.
>
> For all error codes, replace the FRU or take the action indicated.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).

Error code/symptom	FRU/action
001-250-000 (Failed system board ECC)	• **System board**
001-250-001 (Failed system board ECC)	• **System board**
001-XXX-000 (Failed core tests)	• **System board**
001-XXX-001 (Failed core tests)	• **System board**
005-XXX-000 (Failed video test)	1. **Video adapter (if installed)** 2. System board
011-XXX-000 (Failed COM1 serial port test)	1. **Check loopback plug connected to externalized serial port.** 2. Check cable from externalized port to system board. 3. System board.
011-XXX-001 (Failed COM2 serial port test)	1. **Check loopback plug connected to externalized serial port.** 2. Check cable from externalized port to system board. 3. System board.
014-XXX-000 (Failed parallel port test)	• **System board**
015-XXX-001 (USB interface not found, board damaged)	1. **System board**
015-XXX-015 (Failed USB external loopback test)	1. **Make sure the parallel port is not disabled.** 2. Run the USB external loopback test again. 3. System board.
015-XXX-198 (Remote Supervisor Adapter II installed *or* USB device connected during USB test)	1. **If Remote Supervisor Adapter II is installed as an option, remove it and rerun test.** **Note:** If Remote Supervisor Adapter II is present as a standard installation, do not remove it; the test cannot be run. 2. Remove USB devices and rerun test. 3. System board.
020-XXX-000 (Failed PCI interface test)	• **System board**
030-XXX-00N (Failed SCSI interface test)	• **If N=0, SCSI daughter card; if N>0, SCSI adapter in slot N.**

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).

Error code/symptom	FRU/action
035-253-s99 (RAID adapter initialization failure)	1. **ServeRAID adapter in slot s is not configured properly.** Obtain the basic and extended configuration status and see the *ServeRAID Hardware Maintenance Manual* for more information. 2. Cable. 3. Adapter.
035-XXX-099 (No adapters were found.)	• **If adapter is installed re-check connection.**
035-XXX-s99 (Failed RAID test on PCI slot s. s = number of failing PCI slot.)	1. **RAID adapter** 2. Cable 3. System board
035-XXX-snn (s = number of failing PCI slot, nn = SCSI ID of failing fixed disk.)	• **Hard disk drive with SCSI ID nn on RAID adapter in PCI slot s.**
089-XXX-001 (Failed microprocessor test)	1. **Verify microprocessor 1 is installed and seated correctly.** 2. Verify BIOS code is at latest level. 3. Microprocessor 1. 4. System board.
089-XXX-002 (Failed optional microprocessor test)	1. **Verify microprocessor 2 is installed and seated correctly.** 2. Verify BIOS code is at latest level. 3. Microprocessor 2. 4. System board.
201-XXX-0nn (Failed memory test.)	1. **DIMM Location slots 1-4 where nn = DIMM location.** **Note:** nn 1=DIMM 1; 2=DIMM 2; 3=DIMM 3; 4=DIMM 4. 2. System board.
201-XXX-999 (Multiple DIMM failure, see error text)	1. **See error text for failing DIMMs.** 2. System board.
202-XXX-001 (Failed system cache test)	1. **Verify microprocessor 1 is installed and seated correctly.** 2. Verify BIOS code is at latest level. 3. Microprocessor 1. 4. System board.
202-XXX-002 (Failed system cache test)	1. **Verify microprocessor 2 is installed and seated correctly.** 2. Verify BIOS code is at latest level. 3. Microprocessor 2. 4. System board.
206-XXX-000 (Failed diskette drive test)	1. **Rerun the test using another diskette.** 2. Cable. 3. Diskette drive. 4. System board.
215-XXX-000 (Failed IDE CD-ROM drive test)	1. **Rerun the test using another CD-ROM.** 2. CD-ROM drive cables. 3. CD-ROM drive. 4. System board.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).

Error code/symptom	FRU/action
217-198-XXX (Could not establish drive parameters)	1. **Check cable and termination.** 2. Hard disk drive backplane. 3. SCSI daughter card 4. Hard disk drive.
217-XXX-00n (Failed hard disk drive test) **Note:** If RAID is configured, the hard disk drive number refers to the RAID logical array.	1. **Hard disk drive n** 2. SCSI card 3. Hard disk drive backplane
301-XXX-000 (Failed keyboard test)	• **Keyboard** • System board
302-XXX-000 (Failed mouse test)	• **Mouse** • System board
405-XXX-000 (Failed Ethernet test on controller on the system board)	1. **Verify that Ethernet is not disabled in BIOS.** 2. System board.
405-XXX-00n (Failed Ethernet test on adapter in PCI slot n)	1. **For n=0, system board** 2. For n>0, adapter in PCI slot n 3. System board
405-XXX-a0n (Failed Ethernet test on adapter in PCI slot a)	1. **For a = 0, system board** 2. For a > 0, adapter in PCI slot a
415-XXX-000 (Failed Modem test) **Note:** Error message may indicate modem is not supported.	1. **Cable** **Note:** Ensure modem is present and attached to server. 2. Modem 3. System board

System board LEDs

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).

LED	FRU/action
DIMM x	1. **DIMM x** 2. System board
Standby power **Note:** Normal operation is indicated when this LED is lit and the server is connected to an ac power source. A problem is indicated if the LED is not lit when connected to ac power.	1. **Power supply** 2. System board
System fan 2	1. **Fan 2** 2. System board

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
LED	**FRU/action**
System fan 1	1. **Fan 1** 2. System board
Microprocessor	1. **Microprocessor** 2. System board

Error symptoms

You can use the error symptom table to find solutions to problems that have definite symptoms.

If you cannot find the problem in the error symptom charts, go to "Starting the diagnostic programs and viewing the test log" on page 17 to test the server.

If you have just added new software or a new option and the server is not working, use the following procedures before using the error symptom charts:

- Remove the software or device that you just added.
- Run the diagnostic tests to determine whether the server is running correctly.
- Reinstall the new software or new device.

In the following table, if the entry in the FRU/action column is a suggested action, perform that action; if it is the name of a component, reseat the component and replace it if necessary. The most likely cause of the symptom is listed first.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
CD-ROM drive problems	
Symptom	**FRU/action**

CD-ROM drive is not recognized.	1. **Verify that:**
	  • The IDE channel to which the CD-ROM drive is attached (primary or secondary) is enabled in the Configuration/Setup Utility program.
	  • All cables and jumpers are installed correctly.
	  • The correct device driver is installed for the CD-ROM drive.
	2. Run CD-ROM drive diagnostics.
	3. CD-ROM drive.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
Expansion enclosure problems	
Symptom	**FRU/action**

The SCSI expansion enclosure used to work but does not work now.	1. **Verify that:**
	  • The cables for all external SCSI options are connected correctly.
	  • The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly.
	  • Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server.
	2. For more information, see the SCSI expansion enclosure documentation.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
Hard disk drive problems	
Symptom	**FRU/action**
Not all drives are recognized by the hard disk drive diagnostic test (Fixed Disk test).	1. **Remove the first drive not recognized and try the hard disk drive diagnostic test again.** 2. If the remaining drives are recognized, replace the drive you removed with a new one.
System stops responding during hard disk drive diagnostic test.	1. **Remove the hard disk drive being tested when the server stopped responding and try the diagnostic test again.** 2. If the hard disk drive diagnostic test runs successfully, replace the drive you removed with a new one.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
General problems	
Symptom	**FRU/action**
Problems such as broken cover locks or indicator LEDs not working	• **Broken CRU/FRU**

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
Intermittent problems	
Symptom	**FRU/action**
A problem occurs only occasionally and is difficult to detect.	1. **Verify that:** • All cables and cords are connected securely to the rear of the server and attached options. • When the server is turned on, air is flowing from the rear of the server at the fan grill. If there is no airflow, the fan is not working. This causes the server to overheat and shut down. • Ensure that the SCSI bus and devices are configured correctly and that the last external device in each SCSI chain is terminated correctly. 2. Check the system error log.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
Keyboard, mouse, or pointing-device problems	
Symptom	**FRU/action**
All or some keys on the keyboard do not work.	1. **Verify that:** • The keyboard cable is securely connected to the system, and the keyboard and mouse cables are not reversed. • The server and the monitor are turned on. 2. Keyboard. 3. System board.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
Keyboard, mouse, or pointing-device problems	
Symptom	**FRU/action**

The mouse or pointing device does not work.	1. **Verify that:**
	   • The mouse or pointing-device cable is securely connected, and that the keyboard and mouse cables are not reversed.
	   • The mouse device drivers are installed correctly.
	2. Mouse or pointing device.
	3. System board.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
Memory problems	
Symptom	**FRU/action**

The amount of system memory displayed is less than the amount of physical memory installed.	1. **Verify that:**
	   • The memory modules are seated properly.
	   • You have installed the correct type of memory.
	   • If you changed the memory, you updated the memory configuration with the Configuration/Setup Utility program.
	   • All banks of memory on the DIMMs are enabled. The server might have automatically disabled a DIMM bank when it detected a problem or a DIMM bank could have been manually disabled.
	2. Check POST error log for error message 289:
	   • If the DIMM was disabled by a system-management interrupt (SMI), replace the DIMM.
	   • If the DIMM was disabled by the user or by POST:
	     a. Start the Configuration/Setup Utility program.
	     b. Enable the DIMM.
	     c. Save the configuration and restart the server.
	3. DIMM.
	4. System board.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
Microprocessor problems	
Symptom	**FRU/action**
The server emits a continuous tone during POST. (The startup (boot) microprocessor is not working properly.)	1. **Verify that the startup microprocessor is seated properly.** 2. Startup microprocessor.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
Monitor problems	
Symptom	**FRU/action**
Testing the monitor.	• **See the information that comes with the monitor** for adjusting and testing instructions. (Some IBM monitors have their own self-tests.)

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).

Monitor problems	
Symptom	**FRU/action**

The screen is blank.	1. **Verify that:**
	  • The server power cord is plugged into the server and a working electrical outlet.
	  • The monitor cables are connected properly.
	  • The monitor is turned on and the Brightness and Contrast controls are adjusted correctly.
	  • If the servers are C2T chained together, verify that:
	    – The C2T chain cables are securely connected to the servers.
	    – The C2T breakout cable is connected properly.
	    – A server that is turned on is selected.
	
	  Important: In some memory configurations, the 3-3-3 beep code might sound during POST followed by a blank display screen. If this occurs and the **Boot Fail Count** feature in the Start Options of the Configuration/Setup Utility program is set to **Enabled** (its default setting), you must restart the server three times to force the system BIOS to reset the CMOS values to the default configuration (memory connector or bank of connectors enabled).
	
	2. Make sure that damaged BIOS code is not affecting the video; see "Recovering from a POST/BIOS update failure" on page 20.
	
	3. If you have verified these items and the screen remains blank, replace:
	   a. Monitor
	   b. Video adapter, if installed
	   c. System board

Only the cursor appears.	• **See "Undetermined problems" on page 97.**

The monitor works when you turn on the server but goes blank when you start some application programs.	1. **Verify that:**
	  • The application program is not setting a display mode higher than the capability of the monitor.
	  • The primary monitor cable is connected to the C2T device breakout cable.
	  • You installed the necessary device drivers for the applications.
	
	2. If you have verified these items and the screen remains blank, replace the monitor.

The screen is wavy, unreadable, rolling, distorted, or has screen jitter.	1. **If the monitor self-tests show the monitor is working properly, consider the location of the monitor.** Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.) Then move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor.
	
	  Notes:
	  a. To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 76 mm (3 in.).
	  b. Non-IBM monitor cables might cause unpredictable problems.
	  c. An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. For information about the enhanced monitor cable, contact your IBM reseller or IBM marketing representative.
	
	2. Video adapter, if installed.
	
	3. System board.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
Monitor problems	
Symptom	**FRU/action**
Wrong characters appear on the screen.	1. **If the wrong language is displayed, update the BIOS code with the correct language.** 2. Video adapter, if installed. 3. System board.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
Option problems	
Symptom	**FRU/action**
An IBM option that was just installed does not work.	1. **Verify that:** • The option is designed for the server (see the ServerProven® list at http://www.ibm.com/pc/compat/). • You followed the installation instructions that came with the option. • The option is installed correctly. • You have not loosened any other installed options or cables. • You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration. 2. Option you just installed.
An IBM option that used to work does not work now.	1. **Verify that all of the option hardware and cable connections are secure.** 2. If the option comes with its own test instructions, use those instructions to test the option. 3. If the failing option is a SCSI option, verify that: • The cables for all external SCSI options are connected correctly. • The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. • Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server. 4. Failing option.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).	
Power problems	
Symptom	**FRU/action**

The server does not turn on.	1. **Verify that:**
	• The power cables are properly connected to the server.
	• The electrical outlet functions properly.
	• The type of memory installed is correct.
	• If you just installed an option, remove it, and restart the server. If the server now turns on, you might have installed more options than the power supply supports.
	2. If LEDs for microprocessors or VRMs are on, verify that:
	   a. A VRM is installed if a second microprocessor is present.
	   b. All microprocessors have the same speed.
	3. See "Undetermined problems" on page 97.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).

Power problems	
Symptom	**FRU/action**

The server does not turn off.	1. **Verify whether you are using an ACPI or non-ACPI operating system.** If you are using a non-ACPI operating system:
	  a. Press Ctrl+Alt+Delete.
	  b. Turn off the system by holding the power-control button for 4 seconds.
	  c. If server fails during BIOS POST and power-control button does not work, remove the AC power cord.
	2. If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).

Serial port problems	
Symptom	**FRU/action**

The number of serial ports identified by the operating system is less than the number of serial ports installed.	1. **Verify that:**
	  • Each port is assigned a unique address by the Configuration/Setup Utility program and none of the serial ports is disabled.
	  • The serial-port adapter, if you installed one, is seated properly.
	2. Failing serial port adapter.

A serial device does not work.	1. **Verify that:**
	  • The device is compatible with the server.
	  • The serial port is enabled and is assigned a unique address.
	  • The device is connected to the correct port (see Chapter 5, "Input/output connectors," on page 53).
	2. Failing serial device.
	3. Serial adapter, if installed.
	4. System board.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer (CRU), and which components must be replaced by a field service technician (FRU).

Software problem	
Symptom	**FRU/action**

Suspected software problem.	1. **To determine if problems are caused by the software, verify that:**
	  • The server has the minimum memory needed to use the software. For memory requirements, see the information that comes with the software.
	  Note: If you have just installed an adapter or memory, you might have a memory address conflict.
	  • The software is designed to operate on the server.
	  • Other software works on the server.
	  • The software that you are using works on another system.
	
	If you received any error messages when using the software program, see the information that comes with the software for a description of the messages and suggested solutions to the problem.
	2. If you have verified these items and the problem remains, contact your place of purchase.

Service processor error codes

When viewed from POST, service processor (baseboard management controller) error codes will appear in hexadecimal form (generally beginning with A2, A3, A4, A5, A6, A7, AD, AE, or E1), unless a Remote Supervisor Adapter is installed. However, when viewed from the system-error log, the messages will appear as text. To determine a possible error condition for the service processor, see the system-error log (see "Starting the diagnostic programs and viewing the test log" on page 17).

ServeRAID error codes

In the following error codes, x can be any number or letter.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer, and which components must be replaced by a field service technician.

Error code/symptom	FRU/action
1xxx (Microcode checksum error)	1. ServeRAID controller
2xxx (Code DRAM error)	1. Install download jumpers, flash latest level BIOS and firmware for controller. Remove jumpers. 2. ServeRAID controller.
3000-31xx(Code DRAM error)	1. Install download jumpers, flash latest level BIOS and firmware for controller. Remove jumpers. 2. ServeRAID controller.
3200 (Code DRAM error)	1. Install download jumpers, flash latest level BIOS code and firmware for controller. Remove jumpers. 2. ServeRAID controller.
3300 (ServeRAID-5i only)	1. Install ServeRAID-5i controller in an extended PCI expansion slot. See the documentation that came with the server for more information.
3E20 (ServeRAID-5i only)	1. Remove the ServeRAID-5i controller from its slot and install it in the proper PCI option slot. 2. Verify that the ServeRAID-5i controller is supported in this server. 3. ServeRAID-5i controller. 4. System board.
3E2x	1. Reseat the ServeRAID controller. 2. Flash latest level of BIOS code and firmware for controller. 3. ServeRAID-5i controller. 4. Integrated RAID controller on serve).
4xxx thru 5xxx (Code DRAM error)	1. Install download jumpers, flash latest level BIOS code and firmware for controller; then, remove jumpers. 2. ServeRAID controller.
6xxx (Cache DRAM error) (ServeRAID-4H only)	1. Reseat daughter card. 2. Install download jumpers, flash latest level BIOS code and firmware for controller; then, remove jumpers. 3. ServeRAID controller.

Note: See Chapter 8, "Parts listing, Type 8482 and 8487," on page 99 to determine which components are replaceable by the customer, and which components must be replaced by a field service technician.	
Error code/symptom	**FRU/action**
7xxx thru 8xxx (Host/local PCI bus interface error)	1. Flash latest level of BIOS code and firmware for controller. 2. If ServeRAID-4x controller, replace controller. 3. If ServeRAID-5i controller, integrated RAID controller on the server.
9003	1. Flash latest level of BIOS code and firmware for controller. 2. Confirm that this controller is a supported option for this system. 3. ServeRAID controller. 4. Integrated RAID controller on the server).
9xxx thru BZxx (SCSI bus error caused by cables, termination, defective drives, etc.). Z refers to the specific channel or channels that cause the error.	1. Follow indications at "POST (ISPR) error procedures." Follow those instructions before continuing with the next steps listed in this index. 2. SCSI cable. 3. SCSI backplane. 4. Hard disk drive. 5. ServeRAID controller.
EFFE (Firmware code corrupt or download jumpers are in place)	1. Flash latest level BIOS and firmware for controller; then, remove jumpers. 2. ServeRAID controller.
FFFF or other code not listed	1. Follow indications at "POST (ISPR) error procedures." 2. SCSI cable. 3. SCSI backplane. 4. Hard disk drive. 5. ServeRAID controller.

POST (ISPR) error procedures

Use the ISPR error procedures to help you solve ServeRAID problems. A complete list of error codes is listed at "ServeRAID error codes" on page 92.

Note: Where the ISPR error procedures refer to a SCSI backplane, see the chapter of this publication that concerns service replaceable units.

EF10 (Default ISPR)
1. No ISPR error present.

9Zxx thru BZxx (SCSI bus error caused by cables, termination, defective drives, or similar problem)

1. Isolate between SCSI subsystem and controller by disconnecting all SCSI cables from suspect card, and restart.

   Attention: Do not press F5. Doing so changes the server configuration.

   If an ISPR error is still present, perform the following actions until the error is no longer present:

   a. Reseat the controller
   b. Replace the controller

   Notes:

   a. SCSI channel cable details, if any, appear elsewhere in this publication.
   b. The adapter/controller detects a configuration change. *Do not* select **Save Changes**. Instead, press F10 to bypass any options to this effect.

2. If ISPR error is **EF10** after disconnecting cables:

   a. Identify which channel is causing the error by the second digit (Z) of the original ISPR code as indicated in the following table.

      Note: ServeRAID-4H controllers have 4 channels; ServeRAID-4L and -4Lx controllers have only one channel; and ServeRAID-4M and -4Mx controllers have 2 channels. ServeRAID-5i and ServeRAID-6i controllers have no channels. The ServeRAID-5i and ServeRAID-6i use the channel connectors of the onboard integrated SCSI controller.

Table 2. SCSI identifier

SCSI Channel Code (z)	Descriptions
1	Channel 1
2	Channel 2
3	Channel 1 and 2
4	Channel 3
5	Channel 1 and 3
6	Channel 2 and 3
7	Channel 1, 2, and 3
8	Channel 4
9	Channel 1 and 4
A	Channel 2 and 4
B	Channel 1, 2, and 4
C	Channel 3 and 4
D	Channel 1, 3, and 4
E	Channel 2, 3, and 4
F	Channel 1, 2, 3, and 4

   b. Confirm that the channels identified from the error in step 2a are the cause of the error by verifying that the error presents itself *only* when the offending channel is reconnected.

c. Check termination of identified channel.

>   **Note:** SCSI channel termination details, if any, appear elsewhere in this
>   publication.

d. Check for proper backplane jumper configuration.

>   **Note:** SCSI channel jumper details, if any, appear elsewhere in this
>   publication.

e. Check for proper cabling configuration in systems that use hard disk drive
    status cables. Reconnect all cables removed in step 1 on page 94.

f. Disconnect one drive at a time attached to the channel identified in step 2a
    on page 94; then, restart to determine which drive is causing the error.

g. Replace SCSI cable.

h. Replace SCSI backplane.

FFFF or other code not listed

1. Place download jumpers on the controller and try to flash the firmware code to
    the card.

2. Isolate between SCSI subsystem and controller by disconnecting all SCSI
    cables attached to the suspect card, and restart.

    Attention: Do not press F5. Doing so changes the server configuration.

    If ISPR code is **EF10** after disconnecting cables, follow these steps until the
    error is eliminated:

    a.   Identify which channel is causing the error by reconnecting cables one at a
         time and restarting until the error returns.

    b. Check termination of identified channel in step 2a.

    >   **Note:** SCSI channel termination details, if any, appear elsewhere in this
    >   publication.

    c. Disconnect one drive at a time attached to channel identified in step 2a and
        restart each time to determine which drive is causing the problem.

    d. Replace SCSI cable attached to channel identified in step 2a.

    e. Replace backplane attached to channel identified in step 2a.

3. If original ISPR code is still present after disconnecting all SCSI cables and
    restarting, perform the following actions until the error is no longer present:

    * Reseat the controller
    * Replace the controller

SCSI error codes

Error code	FRU/action
All SCSI Errors One or more of the following might be causing the problem: • A failing SCSI device (adapter, drive, controller) • An improper SCSI configuration or SCSI termination jumper setting • Duplicate SCSI IDs in the same SCSI chain • A missing or improperly installed SCSI terminator • A defective SCSI terminator • An improperly installed cable • A defective cable	1. **External SCSI devices must be turned on before you turn on the server.** 2. Make sure that the cables for all external SCSI devices are connected correctly. 3. If you have attached an external SCSI device to the server, make sure the external SCSI termination is set to automatic. 4. Make sure that the last device in each SCSI chain is terminated correctly. 5. Make sure that the SCSI devices are configured correctly.

Undetermined problems

Use the information in this section if the diagnostic tests did not diagnose the failure, the devices list is incorrect, or the server is inoperative.

Damaged data in CMOS memory or damaged BIOS code can cause undetermined problems. To reset the CMOS data, use the CMOS recovery jumper to override the power-on password and clear the CMOS memory; see "Erasing a lost or forgotten password (clearing CMOS memory)" on page 21. If you suspect that the BIOS code is damaged, see "Recovering from a POST/BIOS update failure" on page 20.

Check the LEDs on all the power supplies. If the LEDs indicate the power supplies are working correctly, complete the following steps:
1. Turn off the server.
2. Make sure that the server is cabled correctly.
3. Remove or disconnect the following devices (one at a time) until you find the failure (turn on the server and reconfigure each time):
   • Any external devices
   • Surge suppressor device (on the server)
   • Modem, printer, mouse, or non-IBM devices
   • Each adapter
   • Drives
   • Memory modules (minimum requirement = one 256 MB DIMM)

   Note: Minimum operating requirements are:
           a. Power supply
           b. System board
           c. One microprocessor
           d. Memory (with a minimum of one 256 MB DIMM)
4. Turn on the server. If the problem remains, suspect the following FRUs in the order listed:
   • Power supply
   • System board

Notes:

1. If the problem goes away when you remove an adapter from the system and replacing that adapter does not correct the problem, suspect the system board.

2. If you suspect a networking problem and all the system tests pass, suspect a network cabling problem external to the system.

Problem determination tips

Because of the variety of hardware and software combinations that can be encountered, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from Service Support and Engineering functions.

- Machine type and model
- Microprocessor or hard disk upgrades
- Failure symptom
  - Do diagnostics fail?
  - What message appears in the diagnostics log?
  - What, when, where, single, or multiple servers?
  - Is the failure repeatable?
  - Has this configuration ever worked?
  - If it has been working, what changes were made before it failed?
  - Is this the original reported failure?
- Diagnostics version
  - Type and version level
- Hardware configuration
  - Print (print screen) configuration currently in use
  - BIOS level
- Operating system software
 - Type and version level

Note: To eliminate confusion, identical systems are considered identical only if they:

- Are the exact machine type and models
- Have the same BIOS level
- Have the same adapters/attachments in the same locations
- Have the same address jumpers/terminators/cabling
- Have the same software versions and levels
- Have the same diagnostics code (version)
- Have the same configuration options set in the system
- Have the same setup for the operation system control files

Comparing the configuration and software setup between working and non-working servers will often lead to problem resolution.

Chapter 8. Parts listing, Type 8482 and 8487

The following parts information is for the xSeries 206 Type 8482 (models 11X, 14X, 15X, 21X, 24X, 25X, 31X, 34X, 35X, 41X, 44X, 45X, 51X, 54X, 55X, 91X) and Type 8487 (models 21X, 24X, 25X, 41X, 44X, 45X, 51X, 54X, 55X, 61X, 71X, 91X).
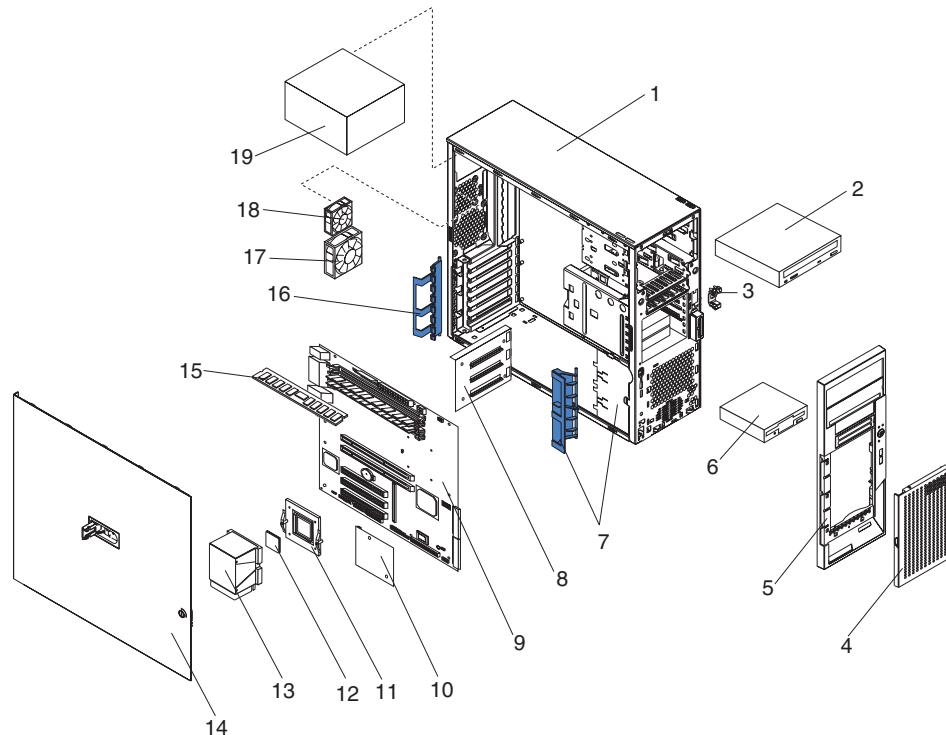
System

Index	System xSeries 206, Type 8482 (Models 11X, 14X, 15X, 21X, 24X, 25X, 31X, 34X, 35X, 41X, 44X, 45X, 51X, 54X, 55X, 91X) and Type 8487 (Models 21X, 24X, 25X, 41X, 44X, 45X, 51X, 54X, 55X, 61X, 71X, 91X)	FRU No.	CRU/FRU
1	Chassis, staked (all models)	13N2416	FRU
2	CD-ROM drive, 48x, XP (primary) (all models)	33P3203	CRU
2	CD-ROM drive, 48x, XP (alternate) (all models)	33P3207	CRU
2	CD-ROM drive, 48x, XP (alternate) (all models)	33P3211	CRU
2	CD-ROM drive, 48x, XP (alternate) (all models)	33P3289	CRU
3	Control panel assembly (all models)	24P2621	FRU
4	Door assembly (all models)	49P1964	CRU
5	Bezel assembly (all models)	13N2926	CRU
6	Diskette drive (alternate) (all models)	33P3327	CRU
6	Diskette drive (alternate) (all models)	06P5227	CRU
6	Diskette drive (primary) (all models)	76H4091	CRU
7	Card guide (all models)	32P0964	CRU
8	Hard disk drive backplane (8482 models 11X, 21X, 31X, 41X, 51X; 8487 models 21X, 41X, 51X)	33P3169	FRU
9	System board (all models)	13M8299	FRU
10	SCSI card (8482 models 11X, 14X, 21X, 24X, 31X, 34X, 41X, 44X, 51X, 54X; 8487 models 21X, 24X, 41X, 44X, 51X, 54X)	26K3051	FRU
11	Heat sink retention module (all models)	24P4811	FRU
12	Microprocessor, 800/2.8-1M (8482 models 11X, 14X, 15X)	25K9904	FRU
12	Microprocessor, 800/3.0-1M (8482 models 21X, 24X, 25X; 8487 models 21X, 24X, 25X)	25K9903	FRU
12	Microprocessor, 800/3.2-1M (8482 models 31X, 34X, 35X)	25K9902	FRU
12	Microprocessor, 3.2GHz (8482 models 41X, 44X, 45X; 8487 models 41X, 44X, 45X, 61X)	26K8380	FRU
12	Microprocessor, 3.4GHz (8482 models 51X, 54X, 55X; 8487 models 51X, 54X, 55X)	26K8387	FRU
12	Microprocessor, 2.4 GHz (8482 model 91X; 8487 model 91X)	26K8732	FRU
13	Heat sink, fan (8482 models 21X, 24X, 25X)	01R3330	FRU
14	Cover (all models)	49P1965	CRU
15	Memory, 256MB 2700 ECC (8482 models 15X, 25X, 91X)	06P4060	CRU
15	Memory, 256MB 3200 ECC (8482 models 35X, 45X, 55X; 8487 models 25X, 45X, 55X, 91X)	06P4056	CRU
15	Memory, 512MB 2700 ECC (8482 models 11X, 14X, 21X, 24X)	06P4061	CRU
15	Memory, 512MB 3200 ECC (8482 models 31X, 34X, 41X, 44X, 51X, 54X; 8487 models 21X, 24X, 41X, 44X, 51X, 54X, 61X)	06P4057	CRU
15	Memory, 512MB 3200 ECC (8487 model 71X)	06P4058	CRU
16	Retainer (all models)	19K4945	FRU
17	Fan, 80mm (all models)	59P2572	FRU
18	Fan, 60mm (8482 models 11X, 21X, 31X, 41X, 51X; 8487 models 21X, 41X, 51X)	59P8495	FRU
19	Power supply, 340 watt (all models)	74P4496	FRU
	Bar, bezel release (all models)	19K4946	FRU
	Battery, 3.0v (all models)	33F8354	CRU
	Bezel (all models)	59P4791	CRU
	Bezel kit (all models)	00N7082	CRU
	Bezel, hard disk drive filler (8482 models 11X, 21X, 31X, 41X, 51X; 8487 models 21X, 41X, 51X)	06P6245	CRU
	Bezel, hard disk drive filler (slim blank) (all models)	00N7259	CRU
	Bezel, hot-swap drive filler (8482 models 11X, 21X, 31X, 41X, 51X; 8487 models 21X, 41X, 51X)	13N2934	CRU

Index	System xSeries 206, Type 8482 (Models 11X, 14X, 15X, 21X, 24X, 25X, 31X, 34X, 35X, 41X, 44X, 45X, 51X, 54X, 55X, 91X) and Type 8487 (Models 21X, 24X, 25X, 41X, 44X, 45X, 51X, 54X, 55X, 61X, 71X, 91X)	FRU No.	CRU/FRU
	Bracket, support (all models)	19K4963	FRU
	Bracket, conversion (models 61X, 71X)	32P4743	FRU
	Cable, diskette drive (all models)	03K9340	FRU
	Cable, dual USB 2 (all models)	49P4365	FRU
	Cable, hot swap kit (8482 models 11X, 21X, 31X, 41X, 51X; 8487 models 21X, 41X, 51X)	06P5850	CRU
	Cable, IDE ATA 66/100 (all models)	13N2466	CRU
	Cable, panel mount (8482 models 15X, 25X, 35X, 45X, 55X, 91X; 8487 models 25X, 45X, 55X, 61X, 71X, 91X)	13N2413	FRU
	Cable, SATA (8487 models 61X, 71X)	88P5927	CRU
	Cable, SATA power, split (8487 models 61X, 71X)	13N2411	CRU
	Cable, SCSI 15.75 inch (all models)	59P4201	CRU
	Cable, signal (8482 models 11X, 21X, 31X, 41X, 51X; 8487 models 21X, 41X, 51X)	00N7185	FRU
	Cable, system-error LED (all models)	13N2937	FRU
	Cable, U320 4-drop SCSI (8482 models 14X, 24X, 34X, 44X, 54X; 8487 models 24X, 44X, 54X)	59P2614	CRU
	Cage assembly (all models)	13N2419	FRU
	Card, SATA RAID (8487 models 61X, 71X)	71P8650	CRU
	EMC shield, 3.5 (all models)	32P8501	CRU
	EMC shield, 5.25 (all models)	32P8503	CRU
	Feet, system kit (all models)	59P8537	CRU
	Filler, bezel, three-pack (8482 models 11X, 21X, 31X, 41X, 51X; 8487 models 21X, 41X, 51X)	13N2932	CRU
	Guide assembly (all models)	19K4947	FRU
	Handle cap (all models)	02R0811	CRU
	Handle, support (all models)	19K4936	FRU
	Hard disk drive, 36.4 GB SCSI, 10K (8482 models 14X, 24X, 34X, 44X)	24P3704	CRU
	Hard disk drive, 36.4 GB SCSI, 15K (8482 model 54X; 8487 models 24X, 44X, 54X)	24P3725	CRU
	Hard disk drive, 80.0 GB (8482 model 91X; 8487 model 91X)	71P7293	CRU
	Hard disk drive,160.0 GB SATA (8487 model 61X)	71P7297	CRU
	Hard disk drive, 250.0 GB SATA (8487 model 71X)	71P7313	CRU
	Heatsink (8482 models 11X, 14X, 15X, 21X, 24X, 25X, 31X, 34X, 35X, 41X, 44X, 45X, 51X, 54X, 55X; 8487 models 21X, 24X, 25X, 41X, 44X, 45X, 51X, 54X, 55X)	13N2951	FRU
	Holder, power/LEDs (all models)	59P8500	FRU
	Kit, button (all models)	19K4940	FRU
	Kit, retainer (all models)	73P9582	FRU
	Lock bar assembly (8482 models 11X, 21X, 31X, 41X, 51X; 8487 models 21X, 41X, 51X)	13N2930	FRU
	Label, system service (all models)	13N2990	FRU

Index	System xSeries 206, Type 8482 (Models 11X, 14X, 15X, 21X, 24X, 25X, 31X, 34X, 35X, 41X, 44X, 45X, 51X, 54X, 55X, 91X) and Type 8487 (Models 21X, 24X, 25X, 41X, 44X, 45X, 51X, 54X, 55X, 61X, 71X, 91X)	FRU No.	CRU/FRU
	Miscellaneous hardware kit (all models):	09N5764	FRU
	• Screws, third form, M3.5 (7)		
	• EMC 2-position gasket (1)		
	• I/O blank bracket (1)		
	• Power supply bracket (1)		
	• Isolator supports (4)		
	• Key holder bracket (1)		
	• Slotted screws, M3x5 (4)		
	• RFID clip (1)		
	• System board spacers (4)		
	• SCSI cable clamp (1)		
	• Slotted screws, M3.5 (6)		
	Mouse assembly (all models)	10L6149	CRU
	Power cord (all models)	93F2364	CRU
	Recovery CD		CRU
	Retainer (all models)	73P9578	FRU
	SATA backerplate (8482 models 15X, 25X, 35X, 45X, 55X, 91X; 8487 models 25X, 45X, 55X, 61X, 71X, 91X)	13N2418	FRU
	SATA filler assembly (all models)	13N2928	CRU
	Tray, SATA (8482 models 14X, 15X, 24X, 25X, 34X, 44X, 54X, 91X; 8487 models 24X, 44X, 54X, 61X, 71X, 91X)	26K7344	CRU
	Tray, SATA simple swap (8482 models 14X, 24X, 34X, 44X, 54X, 91X; 8487 models 24X, 44X, 54X, 61X, 71X, 91X)	73P8007	CRU

Recovery CDs

Recovery CD	CRU No.
Microsoft SS 2003 (8487 models 61x, 71)	32R1027
Windows 2003 Standard Edition	31R1481
Windows 2003 Enterprise Edition	31R1482

Keyboard CRUs

Keyboard	CRU No.
US English (103P)	89P8300
Arabic (253)	89P8301
Belgium/French (120)	89P8302
Belgium/UK (120)	89P8303
Brazil/Portuguese (275)	89P8304
Bulgarian (442)	89P8305
Chinese/US (467)	89P8306
Czech ABB	89P8307
Danish (159)	89P8308
Dutch (143)	89P8309
French (189)	89P8310
French Canadian (445)	89P8311
French Canadian (058)	89P8312
German (129)	89P8313
Greek (319)	89P8314
Hebrew (212)	89P8315

Keyboard	CRU No.
Hungarian (208)	89P8316
Iceland (197)	89P8317
Italy (142)	89P8319
Japanese (194)	89P8320
Korean	89P8321
LA Spanish (171)	89P8322
Norwegian (155)	89P8323
Polish (214)	89P8324
Portuguese (163)	89P8325
Romanian (446)	89P8326
Russian (443)	89P8327
Serbian/Cyrillic (118)	89P8329
Slavic (245)	89P8330
Spanish (172)	89P8331
Swedish/Finn (153)	89P8332
Swiss, F/G (150)	89P8333
Thailand (191)	89P8334
Turkish (440)	89P8335
Turkish (179)	89P8336
UK English (166)	89P8337
US English-EMEA (103P)	89P8338
Yugoslav/Lat (234)	89P8339

Power cord CRUs

For your safety, IBM provides a power cord with a grounded attachment plug to use with this IBM product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

IBM power cords used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

IBM power cords for a specific country or region are usually available only in that country or region.

IBM power cord part number	Used in these countries and regions
02K0546	China
13F9940	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea
13F9979	Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Cote D'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Dahomey, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Laos (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire
13F9997	Denmark
14F0015	Bangladesh, Lesotho, Maceo, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda
14F0033	Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Polynesia, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Italy, Libyan Arab Jamahiriya
14F0087	Israel
1838574	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Islands, Canada, Cayman Islands, Costa Rica, Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Taiwan, United States of America, Venezuela
24P6858	Korea (Democratic People's Republic of), Korea (Republic of)
34G0232	Japan
36L8880	Argentina, Paraguay, Uruguay
49P2078	India
49P2110	Brazil
6952300	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This appendix contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your xSeries or IntelliStation® system, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

* Check all cables to make sure that they are connected.
* Check the power switches to make sure that the system is turned on.
* Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM *xSeries Documentation* CD or in the IntelliStation *Hardware Maintenance Manual* at the IBM Support Web site.
* Go to the IBM Support Web site at http://www.ibm.com/pc/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the publications that are provided with your system and software. The information that comes with your system also describes the diagnostic tests that you can perform. Most xSeries and IntelliStation systems, operating systems, and programs come with information that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the information for the operating system or program.

Using the documentation

Information about your IBM xSeries or IntelliStation system and preinstalled software, if any, is available in the documentation that comes with your system. That documentation includes printed books, online books, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to http://www.ibm.com/pc/support/ and follow the instructions. Also, you can order publications through the IBM Publications Ordering System at http://www.elink.ibmlink.ibm.com/public/applications/publications/cgibin/pbi.cgi.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM xSeries and IntelliStation products, services, and support. The address for IBM xSeries information is http://www.ibm.com/eserver/xseries/. The address for IBM IntelliStation information is http://www.ibm.com/pc/intellistation/.

You can find service information for your IBM products, including supported options, at http://www.ibm.com/pc/support/.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with xSeries servers, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, go to http://www.ibm.com/services/sl/products/.

For more information about Support Line and other IBM services, go to http://www.ibm.com/services/, or go to http://www.ibm.com/planetwide/ for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

Hardware service and support

You can receive hardware service through IBM Integrated Technology Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. Go to http://www.ibm.com/planetwide/ for support telephone numbers, or in the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

Appendix B. Related service information

Note: The service procedures are designed to help you isolate problems. They are written with the assumption that you have model-specific training on all computers, or that are familiar with the computers, functions, terminology, and service information provided in this manual.

Safety information

The following section contains the safety information that you need to be familiar with before servicing an IBM computer.

General safety

Follow these rules to ensure general safety:
- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
  1. Ensure you can stand safely without slipping.
  2. Distribute the weight of the object equally between your feet.
  3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
  4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 16 kg (35 lb) or objects that you think are too heavy for you.*
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.
  Remember: Metal objects are good electrical conductors.
- Wear safety glasses when you are: hammering, drilling soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.

Electrical safety

⚠

CAUTION:
Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunication systems, networks, and modems before you open the server covers, unless instructed otherwise in the installation and configuration procedures.

Observe the following rules when working on electrical equipment.

Important: Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.

Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
  - Performing a mechanical inspection
  - Working near power supplies
  - Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has exposed electrical circuits, observe the following precautions:
  - Ensure that another person, familiar with the power-off controls, is near you.
    Remember: Another person must be there to switch off the power, if necessary.
  - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.
    Remember: There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.
  - When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

  Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.
- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.

- *Never assume* that power has been disconnected from a circuit. First, *check* that it has been powered-off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Do not service the following parts with the power on when they are removed from their normal operating places in a machine:
  - Power supply units
  - Pumps
  - Blowers and fans
  - Motor generators

  and similar units. (This practice ensures correct grounding of the units.)
- If an electrical accident occurs:
  - Use caution; do not become a victim yourself.
  - Switch off power.
  - Send another person to get medical aid.

Safety inspection guide

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgment should be used to identify potential safety hazards due to attachment of non-IBM features or options not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:
- Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock).
- Explosive hazards, such as a damaged CRT face or bulging capacitor
- Mechanical hazards, such as loose or missing hardware

The guide consists of a series of steps presented in a checklist. Begin the checks with the power off, and the power cord disconnected.

Checklist:
1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Turn off the computer. Disconnect the power cord.
3. Check the power cord for:
   a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
   b. The power cord should be the appropriate type as specified in the parts listings.
   c. Insulation must not be frayed or worn.
4. Remove the cover.

5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.

6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.

7. Check for worn, frayed, or pinched cables.

8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Handling electrostatic discharge-sensitive devices

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD). ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the server, the part, the work mat, and the person handling the part are all at the same charge.

Notes:

1. Use product-specific ESD procedures when they exceed the requirements noted here.

2. Make sure that the ESD-protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.
- Avoid contact with other people.
- Wear a grounded wrist strap against your skin to eliminate static on your body.
- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
- Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.
- Select a grounding system, such as those in the following list, to provide protection that meets the specific service requirement.

  Note: The use of a grounding system is desirable but not required to protect against ESD damage.

  – Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
  – Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
  – Use the round ground-prong of the ac plug on ac-operated computers.

Grounding requirements

Electrical grounding of the computer is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Safety notices (multilingual translations)

The caution and danger safety notices in this section are provided in the following languages:

- English
- Brazilian/Portuguese
- Chinese
- French
- German
- Italian
- Japanese
- Korean
- Spanish

Important: All caution and danger statements in this IBM documentation begin with a number. This number is used to cross reference an English caution or danger statement with translated versions of the caution or danger statement in this section.

For example, if a caution statement begins with a number 1, translations for that caution statement appear in this section under statement 1.

Be sure to read all caution and danger statements before performing any of the instructions.

Statement 1

DANGER

Electrical current from power, telephone and communication cables is hazardous.

To avoid a shock hazard:

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedure**s.
- **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

To Connect	To Disconnect
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

Statement 2

CAUTION:
When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:
*   **Throw or immerse into water**
*   **Heat to more than 100°C (212°F)**
*   **Repair or disassemble**

Dispose of the battery as required by local ordinances or regulations.

Statement 3

CAUTION:
When laser products (such as CD-ROMs, DVD-ROM drives, fiber optic devices, or transmitters) are installed, note the following:
*   **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
*   **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

DANGER

> **Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following:**
>
> **Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.**

Statement 4
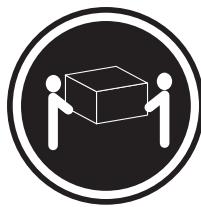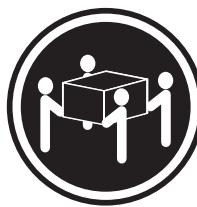
≥18 kg (39.7 lb)   ≥32 kg (70.5 lb)   ≥55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Statement 5

CAUTION:
The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.
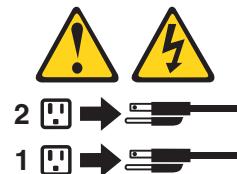
Statement 10

CAUTION:
Do not place any object weighing more than 82 kg (180 lbs.) on top of rack-mounted devices.

Importante:

Todas as instruções de cuidado e perigo da IBM documentation começam com um número. Este número é utilizado para fazer referência cruzada de uma instrução de cuidado ou perigo no idioma inglês com as versões traduzidas das instruções de cuidado ou perigo encontradas nesta seção.

Por exemplo, se uma instrução de cuidado é iniciada com o número 1, as traduções para aquela instrução de cuidado aparecem nesta seção sob a instrução 1.

Certifique-se de ler todas as instruções de cuidado e perigo antes de executar qualquer operação.

Instrução 1

PERIGO

A corrente elétrica proveniente de cabos de alimentação, de telefone e de comunicações é perigosa.

Para evitar risco de choque:
*   Não conecte ou desconecte cabos e não realize instalação, manutenção ou reconfiguração deste produto durante uma tempestade com raios.
*   Conecte todos os cabos de alimentação a tomadas elétricas corretamente instaladas e aterradas.
*   Conecte todos os equipamentos ao qual esse produto será conectado a tomadas corretamente instaladas.
*   Sempre que possível, utilize apenas uma das mãos para conectar ou desconectar cabos de sinal.
*   Nunca ligue qualquer equipamento quando existir evidência de danos por fogo, água ou na estrutura.
*   Desconecte cabos de alimentação, sistemas de telecomunicação, redes e modems antes de abrir as tampas dos dispositivos, a menos que especificado de maneira diferente nos procedimentos de instalação e configuração.
*   Conecte e desconecte cabos conforme descrito na seguinte tabela, ao instalar ou movimentar este produto ou os dispositivos conectados, ou ao abrir suas tampas.

Para Conectar:	Para Desconectar:
1. DESLIGUE Tudo.	1. DESLIGUE Tudo.
2. Primeiramente, conecte todos os cabos aos dispositivos.	2. Primeiramente, remova os cabos de alimentação das tomadas.
3. Conecte os cabos de sinal aos conectores.	3. Remova os cabos de sinal dos conectores.
4. Conecte os cabos de alimentação às tomadas.	4. Remova todos os cabos dos dispositivos.
5. LIGUE os dispositivos.	

Instrução 2

CUIDADO:

Ao substituir a bateria de lítio, utilize apenas uma bateria IBM, Número de Peça 33F8354 ou uma bateria de tipo equivalente, recomendada pelo fabricante. Se o seu sistema possui um móídulo com uma bateria de lítio, substitua-o apenas pelo mesmo tipo de mídulo, do mesmo fabricante. A bateria contém lítio e pode explodir se não for utilizada, manuseada e descartada de maneira correta.

Não:
* Jogue ou coloque na água
* Aqueça a mais de 100°C (212°F)
* Conserte nem desmonte

Para descartar a bateria, entre em contato com a área de atendimento a clientes IBM, pelo telefone (011) 889-8986, para obter informações sobre como enviar a bateria pelo correio para a IBM.

Instrução 3

PRECAUCIÓN:

Quando produtos a laser (unidades de CD-ROM, unidades de DVD, dispositivos de fibra ítica, transmissores, etc.) estiverem instalados, observe o seguinte:
* Não remova as tampas. A remoção das tampas de um produto a laser pode resultar em exposição prejudicial à radiação de laser. Nenhuma peça localizada no interior do dispositivo pode ser consertada.
* A utilização de controles ou ajustes ou a execução de procedimentos diferentes dos especificados aqui pode resultar em exposição prejudicial à radiação.

PERIGO

Alguns produtos a laser contêm um diodo laser da Classe 3A ou Classe 3B embutido. Observe o seguinte:

Radiação de laser quando aberto. Não olhe diretamente para o raio a olho nu ou com instrumentos íticos, e evite exposição direta ao raio.

Instrução 4
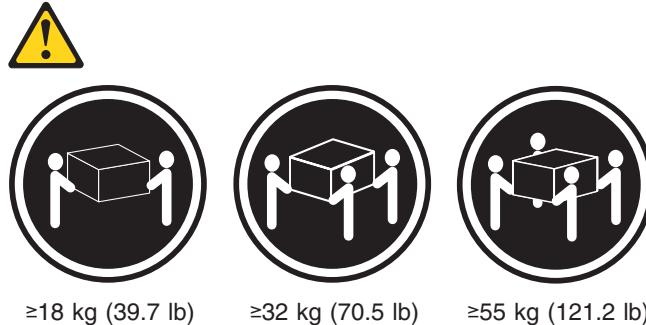
≥18 kg (39.7 lb)   ≥32 kg (70.5 lb)   ≥55 kg (121.2 lb)

CUIDADO:

Ao levantar a máquina, faça-o com segurança.

Instrução 5

CUIDADO:

Os botões Liga/Desliga localizados no dispositivo e na fonte de alimentação não desligam a corrente elétrica fornecida ao dispositivo. O dispositivo também pode ter mais de um cabo de alimentação. Para remover toda a corrente elétrica do dispositivo, assegure que todos os cabos de alimentação estejam desconectados da fonte de energia elétrica.
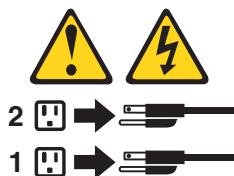
Instrução 10

CUIDADO:

Não coloque nenhum objeto com peso superior a 82 kg (180 lbs.) sobre dispositivos montados em rack.

重要：

Server Library 中的所有提醒和危险条款
前都有一个数字标识。该数字是用来交叉引用一个英
文的提醒和危险条款及本部分中的与之对应的已翻译
成其它文字的提醒和危险条款。

例如，如果一个提醒条款前的数字为 1，则本部分中相
应的译文也带有标号 1。

在执行任何指示的操作之前，请确保您已经阅读了全部
提醒和危险条款。

声明 1

⚠️ ⚡

危险

电源、电话和通信电缆中带有危险电流。

为避免电击：

雷电期间不要拆接电缆或安装、维修及重新配置本产品。

将所有电源线连接至正确布线并已安全接地的电源插座上。

将应与本产品连接的所有设备连接至正确布线的插座上。

尽量只使用单手拆接信号电缆。

有水、火及结构损坏迹象时，请勿打开任何设备。

除非在安装配置过程中有明确指示，否则，打开设备机盖前
应先断开与电源线、远程通信系统、网络和调制解调器的所
有连接。

安装、移动或打开本产品及其附带设备的机盖时，应按下表
所述连接和断开电缆。

连接时：	断开连接时：
1. 关闭所有设备。	1. 关闭所有设备。
2. 首先将所有电缆连接至设备。	2. 首先从插座中拔出电源线。
3. 将信号电缆连接至接口。	3. 从接口上拔下信号电缆。
4. 将电源线连接至插座。	

声明 2

警告:

更换锂电池时,只能使用 IBM 产品号 33F8354 或者是厂商推荐的等同
类型的电池。

如果系统模块中含有锂电池,则只能使用同一厂商制造的同一类型的模
块进行更换。电池中含有锂,如果使用、拿放或处理不当,可能会发生
爆炸。

请勿对电池进行下列操作:
扔入或浸入水电　　　。
加热超过 100 （212 F）
进行修理或分解
请按本地法规要求处理电池。

声明 3

警告:

安装激光产品（如 CD-ROM、DVD 驱动器、光纤设备或送话器）时,应注
意以下事项:

不要拆除外盖。拆除激光产品的外盖可能会导致激光辐射的危险,本设备中
没有用户可维修的部件。

非此处指定的其它控制、调整或与性能有关的操作都有可能导致激光辐射的
危险。

危险

某些激光产品中包含内嵌的 3A 级或 3B 级激光二极管。请注意以下事项。

打开时会产生激光辐射。不要直视光束,不要使用光学仪器直接观看光束,
避免直接暴露于光束之下。

声明 4

≥18 kg (37 磅)　　≥32 kg (70.5 磅)　　≥ 55 kg (121.2 磅)

警告：
抬起时请采用安全操作方法。

声明 5

警告：

使用设备上的电源控制按钮和电源上的开关都不能断开本设备上的电流。
另外，本设备可能带有多条电源线。如要断开设备上的所有电流，请确
保所有电源线均已与电源断开连接。
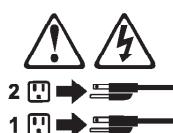
声明 6

警告：

如果在电源线连接设备的一端安装了固定松紧夹，则必须将电源线的另一端连接至
使用方便的电源。

声明 7

警告：

如果设备带有外门，则在移动或抬起设备前应将其拆除或固定
以避免造成人员伤害。外门支撑不了设备的重量。

声明 8

警告：
不要拆除电源外盖或贴有下列标签的任何部件。

贴有此标签的组件内部存在高电压、高电流的危险。这些组件中
没有用户可维修的部件。如果怀疑其中的部件存在问题，应与服
务技术人员联系。

声明 9

警告：

为避免人员伤害，拆除设备上的风扇前应拨下热插拨风扇电缆。

声明 10

警告：

机柜安装的设备上面不能放置重于 82kg（180 磅）的物品。

> 82 kg (180 磅)

重要資訊：

> *Server Library* 中所有「注意」及「危險」的聲明均以數字開始。此一數字是用來作為交互參考之用，英文「注意」或「危險」聲明可在本節中找到相同內容的「注意」或「危險」聲明的譯文。

> 例如，有一「危險」聲明以數字 1 開始，則該「危險」聲明的譯文將出現在本節的「聲明」1 中。

> 執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

聲明 1

危險

> 電源、電話及通信電纜上所產生的電流均有危險性。
>
> 欲避免電擊危險：
>
> −在雷雨期間，請勿連接或切斷本產品上的任何電纜線，或安裝、維修及重新架構本產品。
> −請將電源線接至接線及接地正確的電源插座。
> −請將本產品隨附的設備連接至接線正確的插座。
> −儘可能使用單手來連接或切斷信號電纜線。
> −當設備有火燒或泡水的痕跡，或有結構性損害時，請勿開啟該設備的電源。
> −在安裝及架構之時，若非非常熟悉，在開啟裝置蓋子之前，請切斷電源線、電信系統、網路及數據機。
> −在安裝、移動本產品或附加裝置，或開啟其蓋子時，請依照下表中「連接」及「切斷」電纜線的步驟執行。

連接：	切斷：
1. 關閉所有開關。	1. 關閉所有開關。
2. 先將所有電纜線接上裝置。	2. 先自電源插座拔掉電源線。
3. 將信號電纜接上接頭。	3. 拔掉接頭上的所有信號電纜。
4. 再將電源線接上電源插座。	4. 再拔掉裝置上的所有電纜線。
5. 開啟裝置的電源。	

聲明 2

注意：
更換鋰電池時，只可使用 IBM 零件編號 33F8354 的電池，或製造商建議之相當類型的電池。若系統中具有包含鋰電池的模組，在更換此模組時，請使用相同廠商製造的相同模組類型。如未正確使用、處理或丟棄含有鋰的電池時，可能會引發爆炸。

請勿將電池：
− 丟入或浸入水中
− 加熱超過 100 ℃ (212 ℉)
− 修理或拆開

請遵照當地法令規章處理廢棄電池。

聲明 3

注意：

安裝雷射產品 (如 CD-ROM、DVD 光碟機、光纖裝置或發射器) 時，請注意下列
事項：

— 請勿移開蓋子。移開雷射產品的蓋子，您可能會暴露於危險的雷射輻射之下。
  裝置中沒有需要維修的組件。

— 不依此處所指示的控制、調整或處理步驟，您可能會暴露於危險的輻射之下。

危險

有些雷射產品含有內嵌式 Class 3A 或 Class 3B 雷射二極體。請注意
下列事項：

開啓時會產生雷射輻射。請勿凝視光束，不要使用光學儀器直接觀
察，且應避免直接暴露在光束下。

聲明 4

≥ 18 公斤 (37 磅)   ≥ 32 公斤 (70.5 磅)   ≥ 55 公斤 (121.2 磅)

注意：

抬起裝置時，請注意安全措施。

聲明 5

注意：

裝置上的電源控制按鈕及電源供應器上的電源開關均無法關閉裝置上的電
流。
本裝置可能有一條以上的電源線。如要移除裝置上的所有電流，請確認所
有電源線已與電源分離。
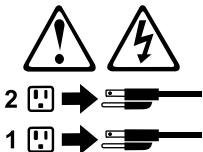
聲明 10

⚠️

注意：
請勿將任何重量超過 82 公斤 (180 磅) 的物品置於已安裝機架的裝置上方。

> 82 公斤 (180 磅)

Important:

Toutes les consignes Attention et Danger indiquées dans la bibliothèque IBM documentation sont précédées d'un numéro. Ce dernier permet de mettre en correspondance la consigne en anglais avec ses versions traduites dans la présente section.

Par exemple, si une consigne de type Attention est précédée du chiffre 1, ses traductions sont également précédées du chiffre 1 dans la présente section.

Prenez connaissance de toutes les consignes de type Attention et Danger avant de procéder aux opérations décrites par les instructions.

Notice n° 1

DANGER

Le courant électrique passant dans les câbles de communication, ou les cordons téléphoniques et d'alimentation peut être dangereux.

Pour éviter tout risque de choc électrique:
- Ne manipulez aucun câble et n'effectuez aucune opération d'installation, d'entretien ou de reconfiguration de ce produit au cours d'un orage.
- Branchez tous les cordons d'alimentation sur un socle de prise de courant correctement câblé et mis à la terre.
- Branchez sur des socles de prise de courant correctement câblés tout équipement connecté à ce produit.
- Lorsque cela est possible, n'utilisez qu'une seule main pour connecter ou déconnecter les câbles d'interface.
- Ne mettez jamais un équipement sous tension en cas d'incendie ou d'inondation, ou en présence de dommages matériels.
- Avant de retirer les carters de l'unité, mettez celle-ci hors tension et déconnectez ses cordons d'alimentation, ainsi que les câbles qui la relient aux réseaux, aux systèmes de télécommunication et aux modems (sauf instruction contraire mentionnée dans les procédures d'installation et de configuration).
- Lorsque vous installez ou que vous déplacez le présent produit ou des périphériques qui lui sont raccordés, reportez-vous aux instructions ci-dessous pour connecter et déconnecter les différents cordons.

Connexion	Déconnexion
1. Mettez les unités hors tension. 2. Commencez par brancher tous les cordons sur les unités. 3. Branchez les câbles d'interface sur des connecteurs. 4. Branchez les cordons d'alimentation sur des prises. 5. Mettez les unités sous tension.	1. Mettez les unités hors tension. 2. Débranchez les cordons d'alimentation des prises. 3. Débranchez les câbles d'interface des connecteurs. 4. Débranchez tous les câbles des unités.

Notice n° 2

ATTENTION:

Remplacez la pile au lithium usagée par une pile de référence identique exclusivement - voir la référence IBM - ou par une pile équivalente recommandée par le fabricant. Si votre système est doté d'un module contenant une pile au lithium, vous devez le remplacer uniquement par un module identique, produit par le même fabricant. La pile contient du lithium et présente donc un risque d'explosion en cas de mauvaise manipulation ou utilisation.
• **Ne la jetez pas à l'eau.**
• **Ne l'exposez pas à une température supérieure à 100 °C.**
• **Ne cherchez pas à la réparer ou à la démonter.**

Pour la mise au rebut, reportez-vous à la réglementation en vigueur.

Notice n° 3

ATTENTION:

Si des produits laser sont installés (tels que des unités de CD-ROM ou de DVD, des périphériques contenant des fibres optiques ou des émetteurs-récepteurs), prenez connaissance des informations suivantes:
• **N'ouvrez pas ces produits pour éviter une exposition directe au rayon laser. Vous ne pouvez effectuer aucune opération de maintenance à l'intérieur.**
• **Pour éviter tout risque d'exposition au rayon laser, respectez les consignes de réglage et d'utilisation des commandes, ainsi que les procédures décrites dans le présent document.**

DANGER

Certains produits laser contiennent une diode laser de classe 3A ou 3B. Prenez connaissance des informations suivantes:

Rayonnement laser lorsque le carter est ouvert. évitez de regarder fixement le faisceau ou de l'observer à l'aide d'instruments optiques. évitez une exposition directe au rayon.

Notice n° 4
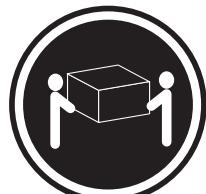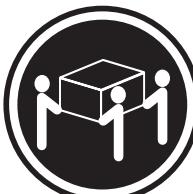
≥18 kg (39.7 lb)   ≥32 kg (70.5 lb)   ≥55 kg (121.2 lb)

ATTENTION:

Faites-vous aider pour soulever ce produit.

Notice n° 5

ATTENTION:

Le bouton de mise sous tension/hors tension de l'unité et l'interrupteur d'alimentation du bloc d'alimentation ne coupent pas l'arrivée de courant électrique à l'intérieur de la machine. Il se peut que votre unité dispose de plusieurs cordons d'alimentation. Pour isoler totalement l'unité du réseau électrique, débranchez tous les cordons d'alimentation des socles de prise de courant.
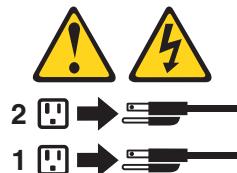
Notice n° 10

ATTENTION:

Ne posez pas d'objet dont le poids dépasse 82 kg sur les unités montées en armoire.

Wichtig:

Alle Sicherheitshinweise in dieser IBM documentation beginnen mit einer Nummer. Diese Nummer verweist auf einen englischen Sicherheitshinweis mit den übersetzten Versionen dieses Hinweises in diesem Abschnitt.

Wenn z. B. ein Sicherheitshinweis mit der Nummer 1 beginnt, so erscheint die übersetzung für diesen Sicherheitshinweis in diesem Abschnitt unter dem Hinweis 1.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

Hinweis 1

VORSICHT

Elektrische Spannungen von Netz-, Telefon- und Datenübertragungsleitungen sind gefährlich.

Aus Sicherheitsgründen:
- Bei Gewitter an diesem Gerät keine Kabel anschließen oder lösen. Ferner keine Installations-, Wartungs- oder Rekonfigurationsarbeiten durchführen.
- Gerät nur an eine Schutzkontaktsteckdose mit ordnungsgemäß geerdetem Schutzkontakt anschließen.
- Alle angeschlossenen Geräte ebenfalls an Schutzkontaktsteckdosen mit ordnungsgemäß geerdetem Schutzkontakt anschließen.
- Signalkabel möglichst einhändig anschließen oder lösen.
- Keine Geräte einschalten, wenn die Gefahr einer Beschädigung durch Feuer, Wasser oder andere Einflüsse besteht.
- Die Verbindung zu den angeschlossenen Netzkabeln, Telekommunikationssystemen, Netzwerken und Modems ist vor dem öffnen des Gehäuses zu unterbrechen. Es sei denn, dies ist in den zugehörigen Installations- und Konfigurationsprozeduren anders angegeben.
- Nur nach den nachfolgend aufgeführten Anweisungen arbeiten, die für Installation, Transport oder öffnen von Gehäusen von Personal Computern oder angeschlossenen Einheiten gelten.

Kabel anschlieβen:	Kabel lösen:
1. Alle Geräte ausschalten und Netzstecker ziehen. 2. Zuerst alle Kabel an Einheiten anschließen. 3. Signalkabel an Anschlußbuchsen anschließen. 4. Netzstecker an Steckdose anschließen. 5. Gerät einschalten.	1. Alle Geräte ausschalten. 2. Zuerst Netzstecker von Steckdose lösen. 3. Signalkabel von Anschlußbuchsen lösen. 4. Alle Kabel von Einheiten lösen.

Hinweis 2

⚠️

ACHTUNG:

Eine verbrauchte Batterie nur durch eine Batterie mit der IBM Teilenummer 33F8354 oder durch eine vom Hersteller empfohlene Batterie ersetzen. Wenn Ihr System ein Modul mit einer Lithium-Batterie enthält, ersetzen Sie es immer mit dem selben Modultyp vom selben Hersteller. Die Batterie enthält Lithium und kann bei unsachgemäßer Verwendung, Handhabung oder Entsorgung explodieren.

Die Batterie nicht:
- mit Wasser in Berührung bringen.
- über 100 C erhitzen.
- reparieren oder zerlegen.

Die örtlichen Bestimmungen für die Entsorgung von Sondermüll beachten.

Hinweis 3

⚠️

ACHTUNG:

Wenn ein Laserprodukt (z. B. CD-ROM-Laufwerke, DVD-Laufwerke, Einheiten mit Glasfaserkabeln oder Transmitter) installiert ist, beachten Sie folgendes.
- Das Entfernen der Abdeckungen des CD-ROM-Laufwerks kann zu gefährlicher Laserstrahlung führen. Es befinden sich keine Teile innerhalb des CD-ROM-Laufwerks, die vom Benutzer gewartet werden müssen. Die Verkleidung des CD-ROM-Laufwerks nicht öffnen.
- Steuer- und Einstellelemente sowie Verfahren nur entsprechend den Anweisungen im vorliegenden Handbuch einsetzen. Andernfalls kann gefährliche Laserstrahlung auftreten.

⚠️

VORSICHT

Manche CD-ROM-Laufwerke enthalten eine eingebaute Laserdiode der Klasse 3A oder 3B. Die nachfolgend aufgeführten Punkte beachten.

Laserstrahlung bei geöffneter Tür. Niemals direkt in den Laserstrahl sehen, nicht direkt mit optischen Instrumenten betrachten und den Strahlungsbereich meiden.

Hinweis 4

≥18 kg   ≥32 kg   ≥55 kg

ACHTUNG:

Beim Anheben der Maschine die vorgeschriebenen Sicherheitsbestimmungen beachten.

Hinweis 5

ACHTUNG:

Mit dem Betriebsspannungsschalter an der Vorderseite des Servers und dem Betriebsspannungsschalter am Netzteil wird die Stromversorgung für den Server nicht unterbrochen. Der Server könnte auch mehr als ein Netzkabel aufweisen. Um die gesamte Stromversorgung des Servers auszuschalten, muß sichergestellt werden, daß alle Netzkabel aus den Netzsteckdosen herausgezogen wurden.
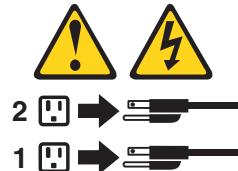
Hinweis 10

ACHTUNG:

Keine Gegenstände, die mehr als 82 kg wiegen, auf Rack-Einheiten ablegen.

Importante:

Tutti gli avvisi di attenzione e di pericolo riportati nella pubblicazione IBM documentation iniziano con un numero. Questo numero viene utilizzato per confrontare avvisi di attenzione o di pericolo in inglese con le versioni tradotte riportate in questa sezione.

Ad esempio, se un avviso di attenzione inizia con il numero 1, la relativa versione tradotta è presente in questa sezione con la stessa numerazione.

Prima di eseguire una qualsiasi istruzione, accertarsi di leggere tutti gli avvisi di attenzione e di pericolo.

Avviso 1

PERICOLO

La corrente elettrica circolante nei cavi di alimentazione, del telefono e di segnale è pericolosa.

Per evitare il pericolo di scosse elettriche:
* Non collegare o scollegare i cavi, non effettuare l'installazione, la manutenzione o la riconfigurazione di questo prodotto durante i temporali.
* Collegare tutti i cavi di alimentazione ad una presa elettrica correttamente cablata e munita di terra di sicurezza.
* Collegare qualsiasi apparecchiatura collegata a questo prodotto ad una presa elettrica correttamente cablata e munita di terra di sicurezza.
* Quando possibile, collegare o scollegare i cavi di segnale con una sola mano.
* Non accendere qualsiasi apparecchiatura in presenza di fuoco, acqua o se sono presenti danni all'apparecchiatura stessa.
* Scollegare i cavi di alimentazione, i sistemi di telecomunicazioni, le reti e i modem prima di aprire i coperchi delle unità, se non diversamente indicato nelle procedure di installazione e configurazione.
* Collegare e scollegare i cavi come descritto nella seguente tabella quando si effettuano l'installazione, la rimozione o l'apertura dei coperchi di questo prodotto o delle unità collegate.

Per collegare:	Per scollegare:
1. SPEGNERE tutti i dispositivi.	1. SPEGNERE tutti i dispositivi.
2. Collegare prima tutti i cavi alle unità.	2. Rimuovere prima i cavi di alimentazione dalle prese elettriche.
3. Collegare i cavi di segnale ai connettori.	3. Rimuovere i cavi di segnale dai connettori.
4. Collegare i cavi di alimentazione alle prese elettriche.	4. Rimuovere tutti i cavi dalle unità.
5. ACCENDERE le unità.	

Avviso 2

ATTENZIONE:

Quando si sostituisce la batteria al litio, utilizzare solo una batteria IBM con numero parte 33F8354 o batterie dello stesso tipo o di tipo equivalente consigliate dal produttore. Se il sistema di cui si dispone è provvisto di un modulo contenente una batteria al litio, sostituire tale batteria solo con un tipo di modulo uguale a quello fornito dal produttore. La batteria contiene litio e può esplodere se utilizzata, maneggiata o smaltita impropriamente.

Evitare di:
• Gettarla o immergerla in acqua
• Riscaldarla ad una temperatura superiore ai 100°C
• Cercare di ripararla o smontarla

Smaltire secondo la normativa in vigore (D.Lgs 22 del 5/2/9) e successive disposizioni nazionali e locali.

Avviso 3

ATTENZIONE:

Quando si installano prodotti laser come, ad esempio, le unità DVD, CD-ROM, a fibre ottiche o trasmettitori, prestare attenzione a quanto segue:
• Non rimuovere i coperchi. L'apertura dei coperchi di prodotti laser può determinare l'esposizione a radiazioni laser pericolose. All'interno delle unità non vi sono parti su cui effettuare l'assistenza tecnica.
• L'utilizzo di controlli, regolazioni o l'esecuzione di procedure non descritti nel presente manuale possono provocare l'esposizione a radiazioni pericolose.

PERICOLO

Alcuni prodotti laser contengono all'interno un diodo laser di Classe 3A o Classe 3B. Prestare attenzione a quanto segue:

Aprendo l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarlo direttamente con strumenti ottici ed evitare l'esposizione diretta al fascio.

Avviso 4

≥18 kg   ≥32 kg   ≥55 kg
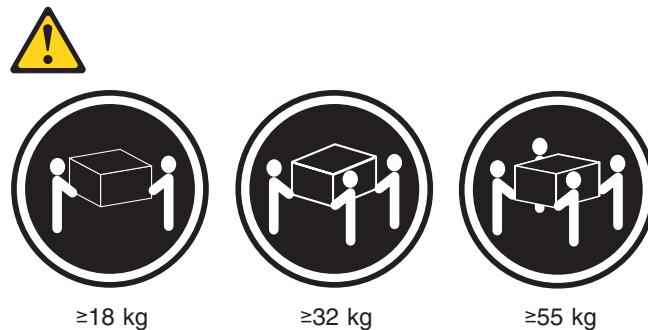
ATTENZIONE:

Durante il sollevamento della macchina seguire delle norme di sicurezza.

Avviso 5

ATTENZIONE:

Il pulsante del controllo dell'alimentazione situato sull'unità e l'interruttore di alimentazione posto sull'alimentatore non disattiva la corrente elettrica fornita all'unità. L'unità potrebbe disporre di più di un cavo di alimentazione. Per disattivare la corrente elettrica dall'unità, accertarsi che tutti i cavi di alimentazione siano scollegati dalla sorgente di alimentazione.

2

1
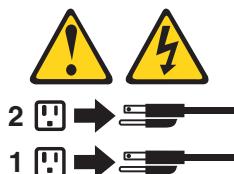
Avviso 10

ATTENZIONE:

Non poggiare oggetti che pesano più di 82 kg sulla parte superiore delle unità montate in rack.

重要 :

Netfinity Server　ライブラリーにあるすべての注意および危険の記述は
数字で始まります。この数字は、英語版の注意および危険の記述と翻訳さ
れた注意および危険の記述を相互参照するために使用します。

例えば、もし注意の記述が数字の１で始まっている場合は、その注意の翻訳は、
記述１　の下にあります。

手順を実施する前に、すべての注意.

・記述　1

⚠ 危険

感電を防止するため、雷の発生時には、いかなるケーブルの
取り付けまたは取り外しも行わないでください。また導入、
保守、再構成などの作業も行わないでください。

感電を防止するため ：

　－電源コードは正しく接地および配線が行われている
　　電源に接続してください。

　－本製品が接続されるすべての装置もまた正しく配線
　　された電源に接続されている必要があります。

できれば、信号ケーブルに取り付けまたは取り外しのとき
は片方の手のみで行うようにしてください。これにより、
電位差がある二つの表面に触ることによる感電を防ぐことが
できます。

電源コード、電話ケーブル、通信ケーブルからの電流は身体に
危険を及ぼします。設置、移動、または製品のカバーを開けたり
装置を接続したりするときには、以下のようにケーブルの接続 、
取り外しを行ってください。

接続するには	取り外すには
1. すべての電源を切る	1. すべての電源を切る
2. まず、装置にすべての ケーブルを接続する。	2. まず、電源コンセントから 電源コードを取り外す
3. 次に、通信ケーブルを コネクターに接続する	3. 次に、通信ケーブルを コネクターから取り外す。
4. その後、電源コンセントに 電源コードを接続する	4. その後、装置からすべての ケーブルを取り外す
5. 装置の電源を入れる。	

・記述 2

⚠ 注意

本製品には、システム・ボード上にリチウム電池が使用さ
れています。電池の交換方法や取り扱いを誤ると、発熱、
発火、破裂のおそれがあります。
電池の交換には、IBM部品番号33F8354の電池またはメーカー
推奨の同等の電池を使用してください。
交換用電池の購入については、お買い求めの販売店または
弊社の営業担当までお問い合わせください。
電池は幼児の手の届かない所に置いてください。
万一、幼児が電池を飲み込んだときは、直ちに医師に相談
してください。
以下の行為は絶対にしないでください。
－水にぬらすこと
－100度C 以上の過熱や焼却
－分解や充電
－ショート
電池を廃棄する場合、および保存する場合にはテープなど
で絶縁してください。他の金属や電池と混ざると発火、
破裂の原因となります。電池は地方自治体の条例、または
規則に従って廃棄してください。ごみ廃棄場で処分される
ごみの中に捨てないでください。

・記述 3

⚠ 注意

レーザー製品（ CD-ROM、DVD、または光ファイバー装置または
送信器などが組み込まれている場合は、下記に御注意ください。

– ここに記載されている制御方法、調整方法、または性能を超えて使用
すると、危険な放射線を浴びる可能性があります。

– ドライブのカバーを開けると、危険な放射線を浴びる可能性があります。
ドライブの内部に修理のために交換可能な部品はありません。カバーを
開けないでください。

⚠ 危険

一部 CD-ROM ドライブは、Class 3A または Class 3B レーザー・
ダイオードを使用しています。次の点に注意してください。

CD-ROMドライブのカバーを開けるとレーザーが放射されます。
光線をみつめたり、光学器械を使って直接見たりしないで
ください。また直接光線を浴びないようにしてください。

・記述 4

⚠ 注意

18Kg 以上　　　32Kg 以上　　　55Kg 以上

装置を持ち上げる場合は、安全に持ち上げる方法に従ってください。

・記述 5

⚠ 注意 ⚡

サーバーの前面にある電源制御ボタンは、サーバーに供給された
電流を遮断しません。
サーバーには、複数の電源コードが接続されているかもしれません。
サーバーから電流を完全に遮断するために、すべての電源コードが
電源から取り外されていることを確認してください。
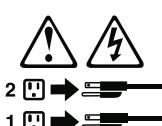
・記述 10

⚠ 注意

ラック・モデルのサーバーの上に 82 Kg 以上の物を置かないで
ください。

중요:

본 *Server Library*에 있는 모든 주의 및 위험 경고문은 번호로
시작합니다. 이 번호는 영문 주의 혹은 위험 경고문과 이 절에 나오는
번역된 버전의 주의 혹은 위험 경고문을 상호 참조하는 데 사용됩니다.

예를 들어, 주의 경고문이 번호 1로 시작하면, 번역된 해당 주의
경고문을 본 절의 경고문 1에서 찾아볼 수 있습니다.

모든 지시사항을 수행하기 전에 반드시 모든 주의 및 위험 경고문을
읽으십시오.

경고문 1

위험

> 전원, 전화 및 통신 케이블로부터 흘러 나오는 전류는
> 위험합니다.
>
> 전기 충격을 피하려면:
>
> - 뇌우를 동반할 때는 케이블의 연결이나 철수, 이 제품의
>   설치, 유지보수 또는 재구성을 하지 마십시오.
>
> - 모든 전원 코드를 적절히 배선 및 접지해야 합니다.
>
> - 이 제품에 연결될 모든 장비를 적절하게 배선된 콘센트에
>   연결하십시오.
>
> - 가능한한 신호 케이블을 한 손으로 연결하거나
>   끊으십시오.
>
> - 화재, 수해 또는 구조상의 손상이 있을 경우 장비를 켜지
>   마십시오.
>
> - 설치 및 구성 프로시저에 다른 설명이 없는 한, 장치 덮개를
>   열기 전에 연결된 전원 코드, 원거리 통신 시스템, 네트워크
>   및 모뎀을 끊어 주십시오.
>
> - 제품 또는 접속된 장치를 설치, 이동 및 덮개를 열 때
>   다음 설명에 따라 케이블을 연결하거나 끊도록 하십시오.

연결하려면:	연결을 끊으려면:
1. 모든 스위치를 끕니다.	1. 모든 스위치를 끕니다.
2. 먼저 모든 케이블을 장치에 연결합니다.	2. 먼저 콘센트에서 전원 코드를 뽑습니다.
3. 신호 케이블을 커넥터에 연결합니다.	3. 신호 케이블을 커넥터에서 제거합니다.
4. 콘센트에 전원 코드를 연결합니다.	4. 장치에서 모든 케이블을 제거합니다.
5. 장치 스위치를 켭니다.	

경고문 2

주의:

리튬 배터리를 교체할 때는 IBM 부품 번호 33F8354 또는 제조업체에서
권장하는 동등한 유형의 배터리를 사용하십시오. 시스템에 리튬 배터리를
갖고 있는 모듈이 있으면 동일한 제조업체에서 생산된 동일한 모듈
유형으로 교체하십시오. 배터리에 리튬이 있을 경우 제대로 사용, 처리
또는 처분하지 않으면 폭발할 수 있습니다.

다음을 주의하십시오.

- 던지거나 물에 담그지 않도록 하십시오.
- 100℃(212℉) 이상으로 가열하지 마십시오.
- 수리하거나 분해하지 마십시오.

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

경고문 3

주의:
레이저 제품(CD-ROMs, DVD 드라이브, 광 장치 또는 트랜스미터 등과
같은)이 설치되어 있을 경우 다음을 유의하십시오.

- 덮개를 제거하지 마십시오. 레이저 제품의 덮개를 제거했을 경우
위험한 레이저 광선에 노출될 수 있습니다. 이 장치 안에는 서비스를
받을 수 있는 부품이 없습니다.

- 여기에서 지정하지 않은 방식의 제어, 조절 또는 실행으로 인해 위험한
레이저 광선에 노출될 수 있습니다.

위험

일부 레이저 제품에는 클래서 3A 또는 클래스 3B 레이저
다이오드가 들어 있습니다. 다음을 주의하십시오.

열면 레이저 광선에 노출됩니다. 광선을 주시하거나 광학 기계를
직접 쳐다보지 않도록 하고 광선에 노출되지 않도록 하십시오.

경고문 4

≥18 kg (37 lbs)   ≥ 32 kg (70.5 lbs)   ≥ 55 kg (121.2 lbs)

주의:
기계를 들 때는 안전하게 들어 올리십시오.

경고문 5

주의:
장치의 전원 제어 버튼 및 전원 공급기의 전원 스위치는 장치에
공급되는 전류를 차단하지 않습니다. 장치에 둘 이상의 전원 코드가
연결되어 있을 수도 있습니다. 장치에서 모든 전류를 차단하려면
모든 전원 코드가 전원으로부터 차단되어 있는 지 확인하십시오.
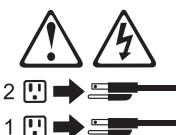
경고문 10

주의:
서랍형 모델의 장치 상단에 82 kg(180 lbs.)이 넘는 물체를 올려
놓지 마십시오.

> 82 kg (180 lbs)

Importante:

Todas las declaraciones de precauciín de esta IBM documentation empiezan con un número. Dicho número se emplea para establecer una referencia cruzada de una declaraciín de precauciín o peligro en inglés con las versiones traducidas que de dichas declaraciones pueden encontrarse en esta secciín.

Por ejemplo, si una declaraciín de peligro empieza con el número 1, las traducciones de esta declaraciín de precauciín aparecen en esta secciín bajo Declaraciín 1.

Lea atentamente todas las declaraciones de precauciín y peligro antes de llevar a cabo cualquier operaciín.

Declaración 1

PELIGRO

La corriente eléctrica de los cables telefínicos, de alimentaciín y de comunicaciones es perjudicial.

Para evitar una descarga eléctrica:
- No conecte ni desconecte ningún cable ni realice las operaciones de instalaciín, mantenimiento o reconfiguraciín de este producto durante una tormenta.
- Conecte cada cable de alimentaciín a una toma de alimentaciín eléctrica con conexiín a tierra y cableado correctos.
- Conecte a tomas de alimentaciín con un cableado correcto cualquier equipo que vaya a estar conectado a este producto.
- Si es posible, utilice una sola mano cuando conecte o desconecte los cables de sent.al.
- No encienda nunca un equipo cuando haya riesgos de incendio, de inundaciín o de daños estructurales.
- Desconecte los cables de alimentaciín, sistemas de telecomunicaciones, redes y mídems conectados antes de abrir las cubiertas del dispositivo a menos que se indique lo contrario en los procedimientos de instalaciín y configuraciín.
- Conecte y desconecte los cables tal como se describe en la tabla siguiente cuando desee realizar una operaciín de instalaciín, de traslado o de apertura de las cubiertas para este producto o para los dispositivos conectados.

Para la conexin	Para la desconexiín
1. APÁGUELO todo. 2. En primer lugar, conecte los cables a los dispositivos. 3. Conecte los cables de señal a los conectores. 4. Conecte cada cable de alimentaciín a la toma de alimentaciín. 5. ENCIENDA el dispositivo.	1. APÁGUELO todo. 2. En primer lugar, retire cada cable de alimentaciín de la toma de alimentaciín. 3. Retire los cables de señal de los conectores. 4. Retire los cables de los dispositivos.

Declaración 2

PRECAUCIÓN:

Cuando desee sustituir la batería de litio, utilice únicamente el número de pieza 33F8354 de IBM o cualquier tipo de batería equivalente que recomiende el fabricante. Si el sistema tiene un mídulo que contiene una batería de litio, sustitúyalo únicamente por el mismo tipo de mídulo, que ha de estar creado por el mismo fabricante. La batería contiene litio y puede explotar si el usuario no la utiliza ni la maneja de forma adecuada o si no se desprende de la misma como corresponde.

No realice las acciones siguientes:
* Arrojarla al agua o sumergirla
* Calentarla a una temperatura que supere los 100°C (212°F)
* Repararla o desmontarla

Despréndase de la batería siguiendo los requisitos que exija el reglamento o la legislaciín local.

Declaración 3

PRECAUCIÓN:

Cuando instale productos láser (como, por ejemplo, CD-ROM, unidades DVD, dispositivos de fibra íptica o transmisores), tenga en cuenta las advertencias siguientes:
* No retire las cubiertas. Si retira las cubiertas del producto láser, puede quedar expuesto a radiaciín láser perjudicial. Dentro del dispositivo no existe ninguna pieza que requiera mantenimiento.
* El uso de controles o ajustes o la realizaciín de procedimientos que no sean los que se han especificado aquí pueden dar como resultado una exposiciín perjudicial a las radiaciones.

PELIGRO

Algunos productos láser contienen un diodo de láser incorporado de Clase 3A o de Clase 3B. Tenga en cuenta la advertencia siguiente.

Cuando se abre, hay radiaciín láser. No mire fijamente el rayo ni lleve a cabo ningún examen directamente con instrumentos ípticos; evite la exposiciín directa al rayo.

Declaración 4

| ≥18 kg | ≥32 kg | ≥55 kg |

PRECAUCIÓN:

Tome medidas de seguridad al levantar el producto.

Declaración 5

PRECAUCIÓN:

El botín de control de alimentaciín del dispositivo y el interruptor de alimentaciín de la fuente de alimentaciín no apagan la corriente eléctrica suministrada al dispositivo. Es posible también que el dispositivo tenga más de un cable de alimentaciín. Para eliminar la corriente eléctrica del dispositivo, asegúrese de desconectar todos los cables de alimentaciín de la fuente de alimentaciín.
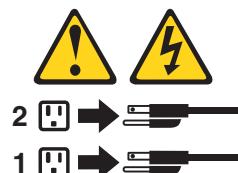
Declaración 10

PRECAUCIÓN:

No coloque ningún objeto que pese más de 82 kg (180 libras) encima de los dispositivos montados en bastidor.

Appendix C. Notices

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Important notes

Processor speeds indicate the internal clock speed of the microprocessor; other factors also affect application performance.

CD-ROM drive speeds list the variable read rate. Actual speeds vary and are often less than the maximum possible.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for approximately 1000 bytes, MB stands for approximately 1 000 000 bytes, and GB stands for approximately 1 000 000 000 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity may vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives available from IBM.

Maximum memory may require replacement of the standard memory with an optional memory module.

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Some software may differ from its retail version (if available), and may not include user manuals or all program functionality.

Product recycling and disposal

This unit contains materials such as circuit boards, cables, electromagnetic compatibility gaskets, and connectors which may contain lead and copper/beryllium alloys that require special handling and disposal at end of life. Before this unit is disposed of, these materials must be removed and recycled or discarded according to applicable regulations. IBM offers product-return programs in several countries. Information on product recycling offerings can be found on IBM's Internet site at http://www.ibm.com/ibm/environment/products/prp.shtml.

Battery return program

This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal of batteries outside the United States, go to http://www.ibm.com/ibm/environment/products/batteryrecycle.shtml or contact your local waste disposal facility.

In the United States, IBM has established a collection process for reuse, recycling, or proper disposal of used IBM sealed lead acid, nickel cadmium, nickel metal hydride, and battery packs from IBM equipment. For information on proper disposal of these batteries, contact IBM at 1-800-426-4333. Have the IBM part number listed on the battery available prior to your call.

In the Netherlands, the following applies.

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